

AWS Machine Costs

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Instance Analysis Per Requirement

For a preliminary analysis of AWS Machine costs by different standards, the machines best suited for our purpose have been categorized using the Amazon Cost Calculator (<https://calculator.aws/#/createCalculator/ec2-enhancement>). For general purpose instances, I found the following instances to be advisable:

Instance name	vCPUs	Memory	Network Performance	Storage	On-Demand Hourly Cost
t3.nano	2	0.5 GiB	Up to 5 Gigabit	EBS only	0.0052
t3.micro	2	1 GiB	Up to 5 Gigabit	EBS only	0.011
t3.small	2	2 GiB	Up to 5 Gigabit	EBS only	0.022
c6g.medium	1	2 GiB	Up to 10 Gigabit	EBS only	0.036
c7g.medium	1	2 GiB	Up to 12500 Megabit	EBS only	0.0384

Meanwhile, for higher demand and more intensive machines, with requests of 32 vCPUs and 16GiB memory, along with up to 15 gigabit internet connections, the following machines seem well suited for our needs:

Instance name	vCPUs	Memory	Network Performance	Storage	On-Demand Hourly Cost
c6g.8xlarge	32	64 GiB	12 Gigabit	EBS only	1.088
c7g.8xlarge	32	64 GiB	15 Gigabit	EBS only	1.1562
c6a.8xlarge	32	64 GiB	12500 Megabit	EBS only	1.224
c6gd.8xlarge	32	64 GiB	12 Gigabit	1 x 1900 NVMe SSD	1.2288
c5a.8xlarge	32	64 GiB	10 Gigabit	EBS only	1.232

Finally, smaller machines have a list of options, which include:

Instance name	vCPUs	Memory	Network Performance	Storage	On-Demand Hourly Cost
t3.small	2	2 GiB	Up to 5 Gigabit	EBS only	0.022
t3.medium	2	4 GiB	Up to 5 Gigabit	EBS only	0.0441
c6g.large	2	4 GiB	Up to 10 Gigabit	EBS only	0.0721
c7g.large	2	4 GiB	Up to 12500 Megabit	EBS only	0.0768
c6gd.large	2	4 GiB	Up to 10 Gigabit	1 x 118 NVMe SSD	0.0814

Instance Type Matching

Taking the top machine types from each of the lists, we can get a list of which machines would be the best for each time period.

Pair #	Low Intensity Instance	Hourly Cost	High Intensity Instance	Hourly Cost
1	t3.small	0.022	c6g.8xlarge	1.088
2	t3.medium	0.0441	c7g.8xlarge	1.1562
3	c6g.large	0.0721	c6a.8xlarge	1.224

Time-based Cost Analysis Criteria

Since we now have 3 pairs of instances to test, we will be analyzing their costs based on the following criteria:

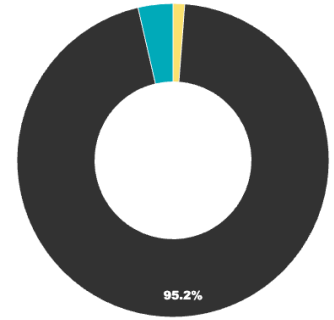
- From 12 AM to 6 AM, KASM will be offline. We do not need to have costs at this time, and the instances will be spun down.
- From 6 AM to 8:30 AM, we will have two smaller instances running to supply about 8 slots for KASM users to log on to so that they can work before school.
- From 8:30 AM to 4:30 PM, we will have two larger instances (we can scale up to three depending on the days) for higher performance for students. Since students will not be on the instances for the whole day, and only for their class period, the users can be easily unloaded and offloaded.
- From 4:30 PM to 12 AM, we will return to the two smaller instances that serve 8 slots

For the smaller instances, if there are more than the limit of people waiting for an instance, they will have to wait until one person logs off and then they can log on. This wait system will be first come first serve, and there will be inactive kickoffs enforced.

Pair #1 Time-based Cost Analysis

In the morning, for pair 1, we will have about 2.5 hours of the instance *t3.small*, which means that we will have a cost of \$0.11 (for 3 hours the cost is \$0.132). During the school day, the instance *c6g.8xlarge* will be running for 8 hours, which is a cost of \$8.704. Finally, we will have 7.5 hours for the two instances of *t3.small* in the afternoon, which leads us to a cost of \$0.33. The total cost, therefore, is \$9.144.

● **t3.small Morning** ● **c6g.8xlarge During School** ● **t3.small Afternoon**

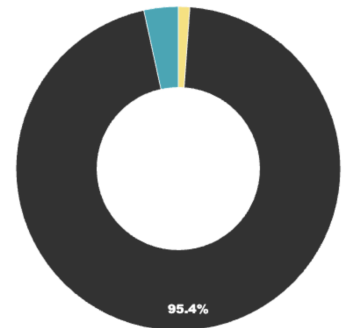


Morning Cost	School Day Cost	Afternoon Cost	Total Cost
\$0.11	\$8.704	\$0.33	\$9.144

Pair #2 Time-based Cost Analysis

In the morning, for pair 2, we will have about 2.5 hours of the instance *t3.medium*, which means that we will have a cost of \$0.2205. During the school day, the instance *c7g.8xlarge* will be running for 8 hours, which is a cost of \$18.4992. Finally, we will have 7.5 hours for the two instances of *t3.medium* in the afternoon, which leads us to a cost of \$0.6615. The total cost, therefore, is \$19.3812.

● **t3.medium Morning** ● **c7g.8xlarge During S...** ● **t3.medium Afternoon**

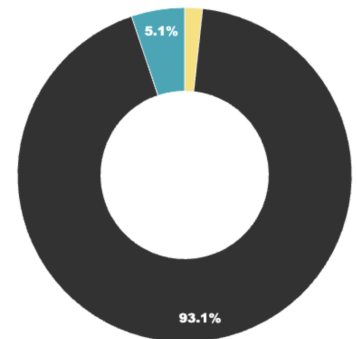


Morning Cost	School Day Cost	Afternoon Cost	Total Cost
\$0.2205	\$18.4992	\$0.6615	\$19.3812

Pair #3 Time-based Cost Analysis

In the morning, for pair 3, we will have about 2.5 hours of the instance *c6g.large*, which means that we will have a cost of \$0.3605. During the school day, the instance *c6a.8xlarge* will be running for 8 hours, which is a cost of \$19.584. Finally, we will have 7.5 hours for the two instances of *c6g.large* in the afternoon, which leads us to a cost of \$1.0815. The total cost, therefore, is \$21.026.

● **c6g.large Morning** ● **c6a.8xlarge During Sch...** ● **c6g.large Afternoon**



Morning Cost	School Day Cost	Afternoon Cost	Total Cost
\$0.3605	\$19.584	\$1.0815	\$21.026