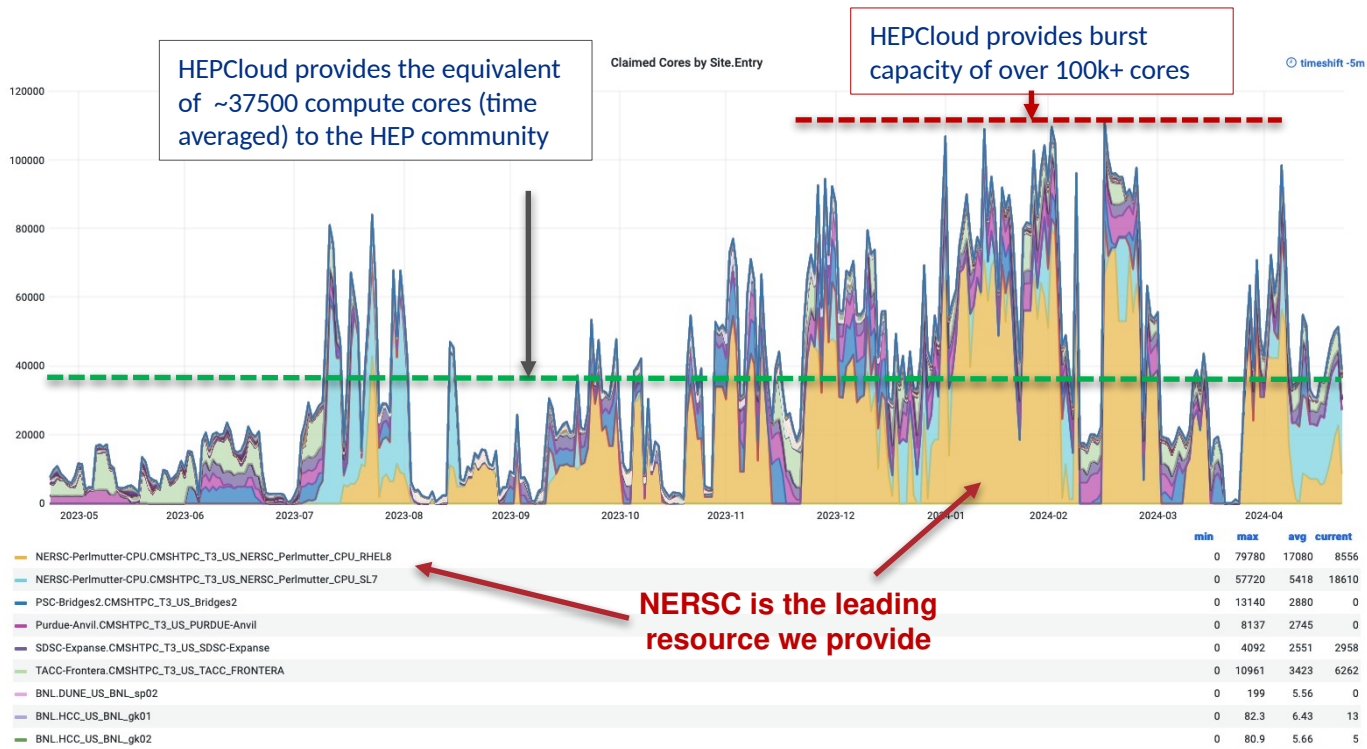# HEPCloud allocation requests & NERSC

Andrew Norman
Sept 2024

HEPCloud and NERSC

- *NERSC provides one of the largest computing resources that is accessible via HEPCloud*

- The NERSC allocation is Annual and goes through the ERCAP (Energy Research Computing Allocations Process) award system

  – The time on NERSC is divided by research offices at DoE (BES, HEP, Nuclear, etc....)

  – Our ERCAP request goes to out HEP program manager for computing (Jeremey Love)

  – The program manager divides the pool he is allocated for all of HEP to different projects

- Currently we have 3 projects that use HEPCloud:

  – CMS (m2612)

  – DUNE (m3249)

  – Everything Else (m4599)

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HEPCloud Leveraged Resources (12 month)

HEPCloud provides the equivalent of ~37500 compute cores (time averaged) to the HEP community

HEPCloud provides burst capacity of over 100k+ cores

Claimed Cores by Site.Entry

⏱ timeshift -5m

NERSC is the leading resource we provide

	min	max	avg	current
NERSC-Perlmutter-CPU.CMSHTPC_T3_US_NERSC_Perlmutter_CPU_RHEL8	0	79780	17080	8556
NERSC-Perlmutter-CPU.CMSHTPC_T3_US_NERSC_Perlmutter_CPU_SL7	0	57720	5418	18610
PSC-Bridges2.CMSHTPC_T3_US_Bridges2	0	13140	2880	0
Purdue-Anvil.CMSHTPC_T3_US_PURDUE-Anvil	0	8137	2745	0
SDSC-Expanse.CMSHTPC_T3_US_SDSC-Expanse	0	4092	2551	2958
TACC-Frontera.CMSHTPC_T3_US_TACC_FRONTERA	0	10961	3423	6262
BNL.DUNE_US_BNL_sp02	0	199	5.56	0
BNL.HCC_US_BNL_gk01	0	82.3	6.43	13
BNL.HCC_US_BNL_gk02	0	80.9	5.66	5

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NERSC HEP

- There are currently over 100 different HEP projects that split the allocation.

- The biggest are the CMS and Atlas allocations

- The DUNE and the other HEPCloud are large

- But we need to use what we ask for

Projects

[Run Report]

Select Columns **17** | Filter Report **1** | Select Rollups | Report Results **100**

CMS

Other HEPCloud

Project	PI	Science Category	Program	Office	CPU Node Hours Charged	CPU Raw Hours	CPU Machine Hours	CPU Compute Allocation	% CPU Used	CPU Balance
m2612	Gutsche, Oliver	Physics : High Energy Physics (Experimental)	High Energy...	High Energy...	933,507.84	933,552.48	933,552.48	1,318,000.00	70.8%	384,492.16
m2616	Calafiura, Paolo	Physics : High Energy Physics (Experimental)	High Energy...	High Energy...	727,558.18	598,672.27	598,672.27	878,000.00	82.9%	150,441.82
mp13	Gupta, Rajan	Physics : High Energy Physics (Theory)	High Energy...	High Energy...	183,233.64	192,275.61	194,220.87	325,000.00	56.4%	141,766.36
desi	Bailey, Stephen	Physics : Cosmology	High Energy...	High Energy...	143,635.00	147,637.86	144,740.97	273,237.91	52.6%	129,602.91
mp113	Tsung, Frank	Physics : Accelerator Science	High Energy...	High Energy...	185,560.37	223,872.79	224,094.90	244,000.00	76.0%	58,439.63
des	Zuntz, Joe	Physics : Cosmology	High Energy...	High Energy...	144,183.54	144,279.11	144,279.11	215,000.00	67.1%	70,816.46
lz	Monzani, Maria Elena	Physics : High Energy Physics (Experimental)	High Energy...	High Energy...	94,840.38	79,791.30	77,007.90	180,870.23	52.4%	86,029.85
m1647	El-Khadra, Aida	Physics : High Energy Physics (Theory)	High Energy...	High Energy...	70,583.59	71,423.90	71,423.90	138,000.00	51.1%	67,416.41
m3592	Schlegel, David	Physics : Cosmology	High Energy...	High Energy...	3,318.68	3,318.68	3,318.68	75,000.00	4.4%	71,681.32
m3166	Safdi, Benjamin	Physics : High Energy Physics (Theory)	High Energy...	High Energy...	48,719.81	74,240.27	74,240.27	75,000.00	65.0%	26,280.19
mp90	Baron, Edward	Physics : Astrophysics	High Energy...	High Energy...	52,975.13	52,975.13	52,975.13	74,000.00	71.6%	21,024.87
m4349	Arora, Gaurav	Physics : Accelerator Science	High Energy...	High Energy...	35,721.65	35,721.65	35,721.65	65,193.05	54.8%	29,471.40
mp107a	Kisner, Theodore	Physics : Cosmology	High Energy...	High Energy...	1,667.36	1,667.36	1,667.36	60,343.07	2.8%	58,675.70
m558	Benedetti, Carlo	Physics : Accelerator Science	High Energy...	High Energy...	49,593.17	44,297.71	44,297.71	60,000.00	82.7%	10,406.83
m1727	Digel, Seth	Physics : Cosmology	High Energy...	High Energy...	25,665.51	25,844.16	25,868.83	50,000.00	51.3%	24,334.49
m4599	Norman, Andrew	Physics : High Energy Physics (Experimental)	High Energy...	High Energy...	28,431.53	24,713.16	24,600.44	47,032.02	60.5%	18,600.49
m3249	Norman, Andrew	Physics : High Energy Physics (Experimental)	High Energy...	High Energy...	2,458.22	2,687.88	2,687.88	45,336.69	5.4%	42,878.47
dune	Dwyer, Dan	Physics : High Energy Physics (Experimental)	High Energy...	High Energy...	5,412.41	5,412.41	5,412.41	44,583.67	12.1%	39,171.27
mp107b	Kisner, Theodore	Physics : Cosmology	High Energy...	High Energy...	11,082.29	11,857.10	11,906.36	33,193.62	33.4%	22,111.34
mp27	Sinclair, Donald	Physics : High Energy Physics (Theory)	High Energy...	High Energy...	22,253.15	22,253.15	22,253.15	28,000.00	79.5%	5,746.85
m2814	Ting, Samuel	Physics : High Energy Physics (Experimental)	High Energy...	High Energy...	15,187.71	15,219.30	15,219.30	26,000.00	58.4%	10,812.29
m1253	Rosenzweig, James	Physics : Accelerator Science	High Energy...	High Energy...	14,382.87	13,338.56	13,338.56	25,644.58	56.1%	11,261.71
m4121	Neumann, Tobias	Physics : High Energy Physics (Theory)	High Energy...	High Energy...	7,721.90	7,677.57	7,677.57	24,620.28	31.4%	16,898.38
m3013	Vafaei-Najafabadi, N...	Physics : Accelerator Science	High Energy...	High Energy...	17,457.71	17,252.60	17,252.60	23,520.27	74.2%	6,062.56

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NERSC HEP

- There are currently over 100 different HEP projects that split the allocation.

- The biggest are the CMS and Atlas allocations

- The DUNE and the other HEPCloud are large

- But we need to use what we ask for

If we don't then we have a harder time on the next allocation cycle

Projects

Select Columns 17 | Filter Report 1 | Select Rollups | Report Results 100

Run Report

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DUNE

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Current State of NERC Allocations

Currently for CPUs:

- CMS is on track with 70% of their CY24 allocation used

- Other HEP Experiments are on track with 100% of their original allocation used, and have received a supplemental allocation (overall 60% usage of total available allocation)

- DUNE is not on track to use their allocation by the end of CY24

Currently for GPUs:

- CMS does not use GPUs

- *Other HEP Experiments have 2200 GPU node hours available (part of supplemental)*

- DUNE is not on track to use their 18k GPU node hours
  (and has another 81k hours in a separate allocation)

- We have a small allocation for testing.
  (See me for access if you are trying to set something up)

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CY25

- Next year's (CY25) allocation process has started.

- ERCAP proposals are due Oct. 7
  - We need to have these done by Oct. 1 so we can review etc...

- All major experiments who have used NERSC in the past have been contacted to provide numbers for 2025 and justifications.
  - We also need references for results/publications from prior awards

- We are drafting the text for the proposal
  - When the text is done you will receive a copy for signoff/approval

- If you need help please contact us.

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Notes:

- NERSC uses an accounting system that can be hard to translate into more natural units

  - In general the conversion factors we use are:

    400 grid cpu hours = 1 nersc Perlmutter node hour

  - But this is application specific, so if you have better numbers please let us know.

- For storage:

  - We use a "stage-in/stage-out" model for data at NERSC as well as a streaming input data model

  - For staging space we have ~100 TB of space that is shared across experiments (except DUNE)

    - For most workflows this works well.

    - You don't need to request extra space unless you are doing something odd.

- For GPUs:

  - Each Perlmutter node has 4 nVidea A100 cards. If you can, benchmark your application on a node and then we can workout how much time you realistically need.

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A plug....

- HEPCloud is a HUGE success in bringing together different resource pools

- NERSC is not the only resource out there!

- If you have the ability to get allocations at other major compute centers we can help you use them!

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Questions?

- Any questions?

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