

Applying for High-Performance Computing Allocations

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Computing Allocations through NSF

National Science Foundation: XSEDE

EXtreme **S**cience and **E**ngineering **D**iscovery **E**nvironment

<https://portal.xsede.org/>

- Manages 6 supercomputing centers around the country
- Supports research funded by *any* agency (not just NSF)
- Can Request different types of allocations
 - Startup Allocations (for new users)
 - Research Allocations

Startup Allocations

Startup Allocation

- The application procedure for a startup allocation is rather simple
- Cannot apply as a graduate student (except NSF Graduate Fellows), but can as a postdoc
 - But you can apply with your advisor as PI and then your advisor can set you up with an account
- Can apply for up to 1,600 node-hours on Stampede2 (valid for 1 year)
 - With 68 cores/node, this is 108,800 core-hours per year
 - NOTE: 8760 hours/year, thus 108,800 cpu-h is like getting 12 cores for a year!
- Application requires only (examples online):
 - Estimate of computing time needed
 - Short abstract of computational project
 - 2-page CV for the PI
- Review of your proposal will be returned within 2 weeks

Research Allocations

Research Allocation

- Reviewed quarterly with multiple reviewers
- Detailed instructions are provided online
- Numerous examples are available on the webpage
- Requirements:
 - Main document (10-15 pages, depending on size of request)
 - Scientific Background and Research Objectives
 - Resource Usage Plan
 - Justification of Allocation and Resource Choice
 - Progress Report (for renewals)
 - Code Performance
 - References
 - CV

Resource Usage Plan

It is best to spell out exactly how you will execute the planned runs:

The 5D simulation dimensions for each simulation are $(n_x, n_y, n_z, n_\lambda, n_\epsilon, n_s) = (128, 128, 64, 32, 32, 2)$. The eight simulations will be run concurrently using 1024 cores each, for a total of 8192 cores per submitted job. For these simulations, we need to run for at least four outer scale times, $4\tau_A$, to observe how the tangling of the magnetic field evolves and saturates. To evolve each simulation for four outer scale times requires 270,000 steps at a timestep of $1.5 \times 10^{-5} \tau_A$. The measured time per step on Stampede using 1024 cores per simulation is 5.4 s. The eight simulations will be run concurrently using 1024 cores each, for a total of 8192 cores per submitted job.

# Cores	Steps/run	Time/step (s)	Wallclock/run (h)	# Runs	Total SUs
8192 (1024 × 8)	270,000	5.4	405	1 (8 simulations each)	3,300,000

We plan to perform 18 restarts requiring 22 h wallclock time each and utilizing 8192 cores per job.

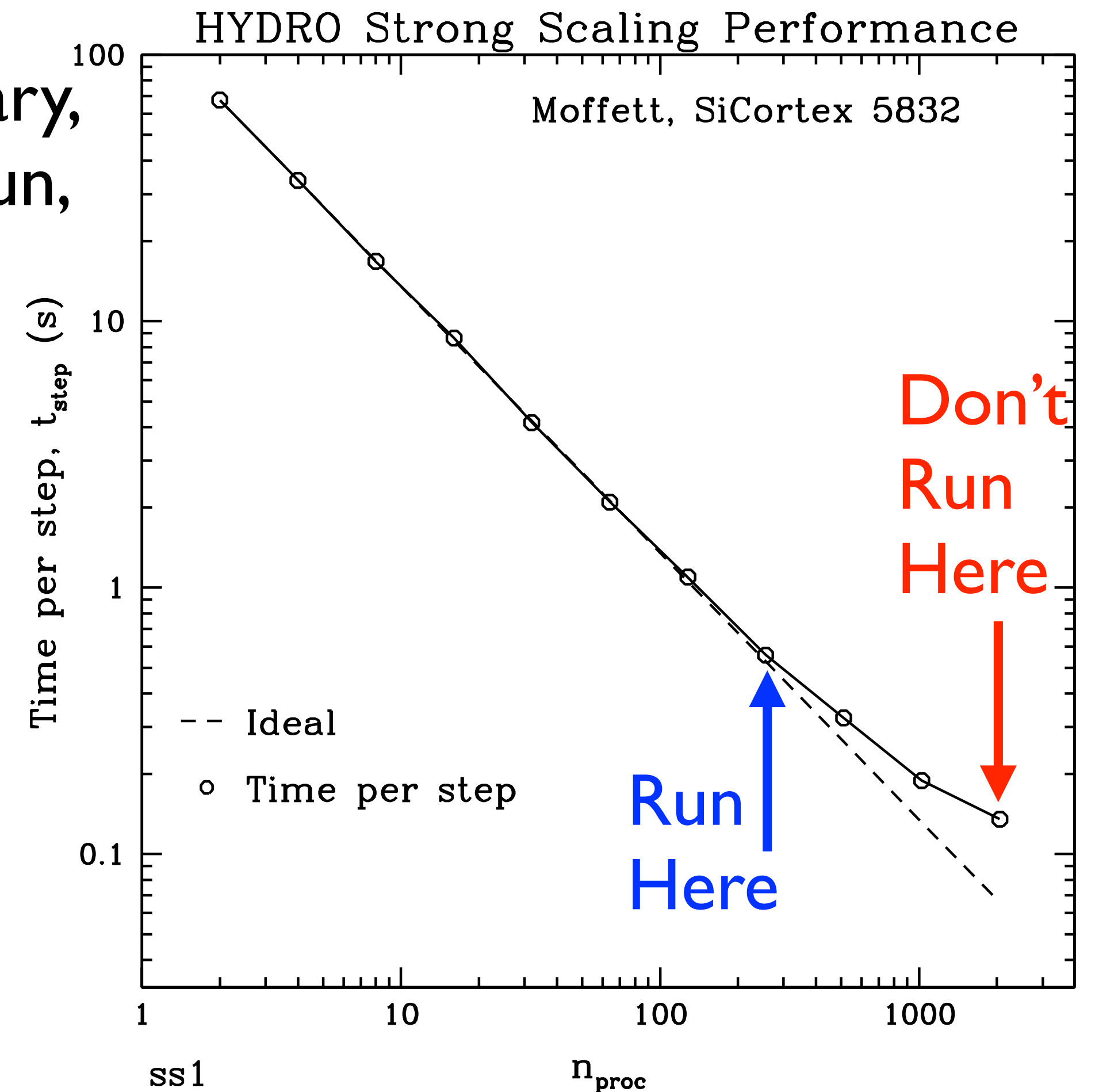
NOTE: As there are only 8760 wallclock hours per year, it is important to show that complete the proposed runs in a feasible number of wallclock hours

Code Performance and Scaling

It is best to provide code performance measurements on the system requested

- A Startup Allocation can be used to gain access to run scaling tests
- If you already have a Research Allocation on another resource, request a Supplement

Some experimentation with parameters is usually necessary, preferably under realistic conditions for a production run, to obtain a good scaling and find the sweet spot



The End