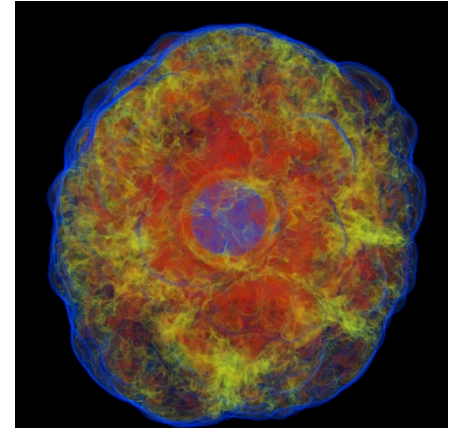
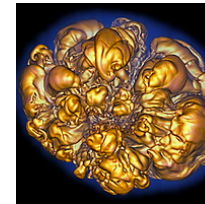
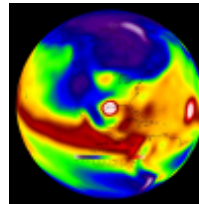
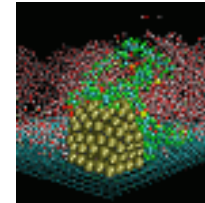
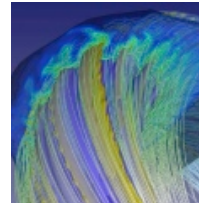
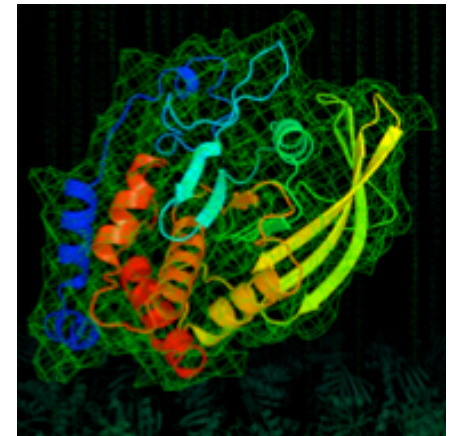
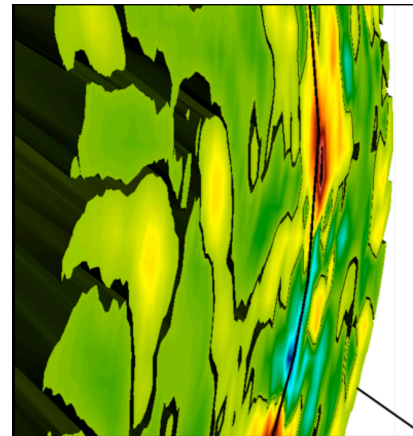


# Roofline Data Collection



Tuomas Koskela  
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NERSC, LBNL, Berkeley, CA

November 8, 2017

- **We are collecting Advisor roofline case studies for a future publication**
- **We ask attendees of this hackathon to follow the link on the hackathon website and fill in details of their application**
  - <https://www.nersc.gov/users/training/events/roofline-training-1182017-1192017/>
  - google: nersc training events
- **Create a snapshot of Advisor result**
  - Integrated roofline is desirable
  - Cache-Aware roofline model results are also valuable

# Link to data collection sheet



www.nersc.gov/users/training/events/roofline-training-1182017-1192017/

Getting Started at NERSC  
Navigating NERSC File Systems  
Chemistry and Material Sciences Applications  
JGI Intro to NERSC  
Data Transfer and Archiving  
Using the Cray XE6  
NERSC User Group Training  
Remote Setup  
2010 Training Events  
Data Day  
Online Tutorials  
Courses  
NERSC Training Accounts Request Form  
Training Links  
OSF HPC Seminars  
» Software  
» Policies  
» User Surveys  
» NERSC Users Group  
» Getting Help  
» Staff Blogs  
» Request Repository Mailing List

**Need Help?**  
**Out-of-hours Status and Password help**  
Call operations:  
1-800-66-NERSC, option 1  
or 510-486-6821  
**Account Support**  
<https://nim.nersc.gov>  
[accounts@nersc.gov](mailto:accounts@nersc.gov)

- To pack results and necessary source/binary files for download, run
  - advixe-cl --snapshot --project-dir <same\_dir\_name> --pack --cache-sources --cache-binaries -- <target\_file\_name>
- If overhead from Advisor is too high, try adding these flags to the survey data collection:
  - interval=40
  - stackwalk-mode=online
  - no-stack-stitching

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### Data Collection

- Once you have collected roofline data with Advisor
  - Please fill in **this spreadsheet**
  - Create a snapshot of results and share it with NERSC user **tkoskela** with the **give** command

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### Downloads

- [1-TKoskela-HowTos.pdf](#) | Adobe Acrobat PDF file
- [2-SWilliams-Roofline-Intro.pdf](#) | Adobe Acrobat PDF file
- [3-ZMatveev-Advisor-Intro.pdf](#) | Adobe Acrobat PDF file
- [4-RGreen-Roofline-at-LANL.pdf](#) | Adobe Acrobat PDF file

**LIVE** X

- View draft
- Edit in CMS
- Log out (Tuomas)

<https://docs.google.com/spreadsheets/d/1ZJbz6qN3gJobffRQkj68SqM8W77P3jgMpJ3...skH7m0/edit?usp=sharing>

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# How to Create Advisor Snapshots



Elapsed time: 34.00s | Vectorized | Not Vectorized

INTEL ADVISOR 2018

Function Call Sites and Loops	Performance Issues	Self Time	Total Time	Type	Why No Vectorization?	Vectorized Loops			FLOPS	
						Vect...	Efficiency	Gain...	VL (...)	Self GFLOP
[loop in bench_stencil_ver1\$omp\$parallel_for@22]	1 Ineffective ...	142.823s	142.823s	Vectorized (B...	novector directive ...	AVX2	80%	3.21x	4	10.237
[loop in bench_stencil_ver3\$omp\$parallel_for@22]	1 Ineffective ...	92.303s	92.303s	Vectorized (Bo...		AVX2	89%	3.55x	4	16.295
[loop in bench_stencil_ver2\$omp\$parallel_for@22]	1 Ineffective ...	90.943s	90.943s	Vectorized (Bo...		AVX2	80%	3.21x	4	15.753
[loop in bench_stencil_ver4\$omp\$parallel_for@22]		67.147s	67.147s	Vectorized (Bo...		AVX2	100%	5.27x	4	22.655
[loop in main\$omp\$parallel_for@26 at main.c:22]		2.736s	2.736s	Vectorized+Thr...	1 vectorization poss...	AVX	82%	3.30x	4	
[loop in bench_stencil_ver2\$omp\$parallel_for@22]		0.492s	91.435s	Scalar	inner loop was alre...					10.476
[loop in bench_stencil_ver1\$omp\$parallel_for@22]		0.336s	143.159s	Scalar	inner loop was alre...					
[loop in bench_stencil_ver3\$omp\$parallel_for@22]		0.304s	92.607s	Scalar	inner loop was alre...					
[loop in bench_stencil_ver0\$omp\$parallel_for@22]	1 Assumed d...	0.208s	142.956s	Scalar	vector dependence...					
[loop in bench_stencil_ver4\$omp\$parallel_for@22]	1 Opportunit...	0.072s	67.219s	Scalar	inner loop was alre...					
[loop in bench_stencil_ver3\$omp\$parallel_for@22]		0.056s	92.663s	Scalar	inner loop was alre...					
[loop in bench_stencil_ver2\$omp\$parallel_for@22]		0.044s	91.479s	Scalar	inner loop was alre...					

Line	Source	Total Time	%	Loop/Function Time	%	Traits
15	double * __restrict__ new = Y;					
16	double * __restrict__ temp;					
17						
18	int istep;					
19						
20	StartTime = omp_get_wtime();					
21	for (istep = 0; istep < NSTEP; istep++){	8.938s				
22	#pragma omp parallel for					
23	for(k=1;k<dim+1;k++){					
24	for(j=1;j<dim+1;j++){					
25	for(i=1;i<dim+1;i++){	0.504s		142.823s		
	[loop in bench_stencil_ver1\$omp\$parallel_for@22 at bench_stencil_v1.c:25] Vectorized AVX; FMA loop processes Float64 data type(s) and includes FMA Loop was unrolled by 4					
	[loop in bench_stencil_ver1\$omp\$parallel_for@22 at bench_stencil_v1.c:25] Scalar peeled loop No loop transformations applied					
	[loop in bench_stencil_ver1\$omp\$parallel_for@22 at bench_stencil_v1.c:25] Vectorized AVX; FMA remainder loop processes Float64 data type(s) and includes FMA No loop transformations applied					
	}					
	}					
		Selected (Total Time):	0.504s			

# Check all boxes!

A screenshot of a dialog box titled "Create a Result Snapshot <@cori09>". The dialog box has a standard Mac OS window title bar with a red close button, a yellow maximize button, and a green window control button. The main content area is light gray and contains the following elements:

- A text input field for "Result name:".
- Two checked checkboxes: "Cache sources" and "Cache binaries".
- A checked checkbox: "Pack into archive".
- A text input field for "Result path:".
- A "Browse..." button to the right of the "Result path:" field.
- "OK" and "Cancel" buttons at the bottom right.