# AMDuProf guide

The Delta documentation has moved to https://docs.ncsa.illinois.edu/systems/delta/. Please update any bookmarks you may have. Click in the link above if you are not automatically redirected in 5 seconds.

- run and collect data
- generate report
- visualize and explore report data
- References:

## run and collect data

Run a batch job and collect data:

```
batch script commands
...
#SBATCH --constraint=perf # perf,nvperf for gpu nodes
cd $SLURM_SUBMIT_DIR
export PATH=/sw/external/amd/AMDuProf_Linux_x64_4.0.341/bin:$PATH
set -v
srun AMDuProfCLI collect --config tbp -o `pwd`/uprof_tbp `pwd`/stream.22gb
srun AMDuProfCLI collect --config inst_access -o `pwd`/uprof_inst_access `pwd`/stream.22gb
srun AMDuProfCLI collect --config assess -o `pwd`/uprof_assess `pwd`/stream.22gb
srun AMDuProfCLI collect --config assess -o `pwd`/uprof_assess _ext `pwd`/stream.22gb
```

#### generate report

After collecting data from a batch job, generate reports with the AMDuProfCLI report option.

```
generate report
[arnoldg@dt-login03 uprof_tbp]$ export PATH=/sw/external/amd/AMDuProf_Linux_x64_4.0.341/bin:$PATH
[arnoldg@dt-login03 uprof_tbp]$ AMDuProfCLI report -i AMDuProf-stream-TBP_Dec-19-2022_09-40-27/
/sw/external/amd/AMDuProf_Linux_x64_4.0.341/bin/AMDuProfCLI
Translation started ...
Translation finished
Generated database file : cpu
Report generation started...
Generating report file...
Report generation completed...
Generated report file: /projects/bbka/slurm_test_scripts/cpu/stream/uprof_tbp/AMDuProf-stream-TBP_Dec-19-
2022_09-40-27/report.csv
```

## visualize and explore report data

You can view the data in AMDuProf on Delta or locally on a copy you install at your desktop system. If you install locally, you may need to replicate some paths or add paths to the binary in order to get full functionality.

Launch AMDuProf (no CLI suffice for the GUI), and import the profile session from a completed batch job run with AMDuProfCLI collect ...

	AMDuProf								
÷	PROFILE				۵				
Welcome		Import Profile Session							
Import Sea	ession(s)	Profile Data File	slurm_test_scripts/cpu/stream/uprof_tbp/AMDuProf-stream-TBP_Dec-19-2022_09-40-27	×	Browse				
About		Root Path to Sources	/projects/bbka/slurm_test_scripts/cpu/stream	×	Browse				
About		Binary Path	Enter path(s) to binary file(s)						
		Source Path Enter path(s) to source file(s)							
		Force Database Regeneration							
		Use cached Source/Binary/Symbol Files							
		Symbols							
			Open Session						
			\$						

The summary view give a high level overview of how time was spent. This is the tbp time-based-profile summary.



The Analyze tab shows hot routines or lines in more detail. The tbp , assess, and inst\_access Analyze views follow.

		AMDuProf - [/projects/bbka/slurc-19-2022_09-40-27]									🛛 🔇			
n PROF	ILE S	SUMMARY	ANALYZ	E SOURCES										\$
Function Hotsp	ots	Ĺ	00:01.000	00:02.000	00:03.000	00:04.000 Profile	<u></u> 00:05.000 Duration	00:06.000	00:07.000	00:08.000		Select Metric	Thread Concurrer	cy 🔻
		Sel	ect View 1	Time based hotspots	<b>v</b> Va	lue Type Samp	ole Count 💌	System Modules	• Include	Exclude		Search for fun	cti Sear	h
				Functions		Modules	CPU_TIME(s) ▼							
		mainomp	_fn.7			stream.22gb	25.10							
		mainomp	_fn.6			stream.22gb	25.05							
		mainomp	_fn.5			stream.22gb	18.95							
		_memmov	/e_avx_unalig	gned_erms		libc-2.28.so	11.70							
		mainomp	_fn.3			stream.22gb	6.41							
		mainomp	_fn.2			stream.22gb	2.93							
		checkSTREA	AMresults			stream.22gb	1.39							
		gomp_team	n_barrier_wa	it_end		libgomp.so.1.0.	0.95							
		memset_a	avx2_unaligr	ned_erms		libc-2.28.so	0.65							
		gomp_barri	ier_wait_end			libgomp.so.1.0.	0.28							
		_dl_addr				libc-2.28.so	0.00							
									\$					

AMDuProf - [/projects/bbka/slurc-19-2022_09-40-37]										
♠ PROFILE	SUMMARY ANALYZ	ZE SOURCES							× 🌣	
Function Hotspots Metrics	00:01.000	0:02.000 00:03.000	0:04.000 00:	05.000 00:06.000	00:07.000	Select Metric	Thread Concurrency	۲		
	Select View	Overall Assessment	Profile Duration Value Type Sample	e Count 💌 Sys	stem Modules	• Include	Exclude	Search for functi	Search	
		Functions	Modules	CYCLES NOT IN HALT V	RETIRED INST	IPC CPI	RETIRED BR INST MISP	(PTI) %RETIRED BR	INST MISP L1 DC ACC	
	main, omp fn.7		stream.22gb	44174	4420	0.10 9.99	0.00	0.00	380.09	
	main. omp fn.6		stream.22gb	44090	3863	0.09 11.41	0.00	0.00	435.41	
	mainomp_fn.5		stream.22gb	32197	3316	0.10 9.71	0.00	0.00	336.25	
	memmove_avx_unali	gned_erms	libc-2.28.so	17665	1125	0.06 15.70	0.00	0.00	731.56	
	mainomp_fn.3		stream.22gb	7945	1664	0.21 4.77	0.00	0.00	334.74	
	mainomp_fn.2		stream.22gb	3475	2209	0.64 1.57	0.00	0.00	251.70	
	checkSTREAMresults		stream.22gb	2638	9503	3.60 0.28	0.00	0.00	84.60	
	gomp_team_barrier_wa	ait_end	libgomp.so.1.0.0	1299	36.08% 137	0.11 9.48	0.00	0.00	423.36	
	memset_avx2_unalig	ned_erms	libc-2.28.so	510	79	0.15 <b>6.46</b>	0.00	0.00	556.96	
	gomp_barrier_wait_end	ł	libgomp.so.1.0.0	248	22	0.09 11.27	0.00	0.00	454.55	
	gettimeofday		vdso64.so	0	0	0.00 0.00	0.00	0.00	0.00	
	gomp_team_barrier_wa	ait_final	libgomp.so.1.0.	0	0	0.00 0.00	0.00	0.00	0.00	
	•								Þ	
			AMDuProf - [/projects/b	obka/slurr-21-2023_11-	-54-28]					

A F	PROFILE	SUMMARY ANALYZE							×	۵
Function Ho	otspots						• Sele	ct Metric L2_CA	CHE_MISSES_FROM_IC_	
		00:01.000 00:02.000 00:0	1 13.000 00:04 Profile Du	.000 00:04.000 00:05.000 Profile Duration			00:07.000	•		
		Select View Instruction Cache 💌	Value Type Sar	nple Count 💌	System Modul	les	Include Exclude	Search for	r functi S	earch
		Functions	Modules	CYCLES_NOT_IN_HALT V	RETIRED_INST	CPI	OP_CACHE_64B_FETCH_MISS_RATIO	IC_MISS_RATIO	IC_MISSES (PTI)	L2_CACHE_ACCESS
		mainomp_fn.7	stream.22gb	21014	3722 5	5.65	0.01	0.31	0.67	0.60
		mainomp_fn.6	stream.22gb	19405	3239 5	5.99	0.01	0.22	0.46	0.42
		mainomp_fn.5	stream.22gb	12991	2755 4	4.72	0.01	0.18	0.36	0.53
		memmove_avx_unaligned_erms	libc-2.28.so	9419	985 9	9.56	0.02	0.10	0.25	0.61
		mainomp_fn.3	stream.22gb	5412	1380	3.92	0.00	0.00	0.00	0.34
		mainomp_fn.2	stream.22gb	2638	1820 1	1.45	0.00	0.50	0.27	0.37
		checkSTREAMresults	stream.22gb	2025	8314 0	0.24	0.00	0.24	0.15	0.07
		gomp_team_barrier_wait_end	libgomp.so.1.0.	1281	136 9	9.42	0.01	0.00	0.00	0.37
		memset_avx2_erms	libc-2.28.so	901	1 9	901.00	1.50	0.00	0.00	175.00
		gomp_barrier_wait_end	libgomp.so.1.0.	518	44 1	11.77	0.04	0.00	0.00	0.57
		gomp_team_start	libgomp.so.1.0.	1	0 0	0.00	0.00	0.00	0.00	0.00
		do_lookup_x	ld-2.28.so	0	0 0	0.00	0.00	0.00	0.00	0.00
		gettimeofday	vdso64.so	0	1 0	0.00	0.00	0.00	0.00	0.00
		gomp_barrier_wait	libgomp.so.1.0.(	0	0 0	0.00	0.00	0.00	0.00	0.00
		handle_amd	libc-2.28.so	0	0 0	0.00	0.00	0.00	0.00	0.00
		-								

Selecting one of the lines or routines will take you to the Sources view where you can see the assembly used in that portion of code.

AMDuProf - [/projects/bbka/slurc-19-2022_09-40-27]								
♠ PROFILE SUMI	MARY ANALYZE	SOURCES					×	۵
mainomp_fn.7								
Select View Time based h	otspots 💌 Va	lue Type Sample Count 💌	Process	stream.22gb (PID 2679082)   100.00%	▼ Thread	s All Thread(s)   100.00%	•	
Address	Line	500 VOLD. 21217. 2010A	Asse	mbly	CPU_TIM			
0xfd6	le	eag (%r9, %rsi), %r11				-		
0xfda	sl	hlg \$4, %r10				-		
0xfde	m	ovabsq \$0x3ba0cd100, %rdi				-		
0xfe8	a	ddq %rdi, %rsi				-		
0xfeb	n	opl (%rax, %rax)				-		
0xff0	m	ovupd (%r11, %rcx), %xmm1			0.01			
0xff6	mo	ovupd (%rbx, %rcx), %xmm3			6.90	)		
0xffb	mu	ulpd %xmm2, %xmm1			15.14			
0xfff	a	ddpd %xmm3, %xmm1			0.11			
0×1003	ma	ovups %xmml, (%rsi, %rcx)			0.19	•		
0×1007	a	ddq \$0x10, %rcx			2.69	-		
0×100b	cr	mpq %rcx, %r10			0.05	5		
0x100e	jı	ne 0xff0			0.01	-		
0×1010	m	ovq %rax, %rcx						
0×1013	a	ndq \$0xfffffffffffffffe, %rc	x					
0×1017	a	ddq %rcx, %rdx						
0x101a	cr	mpq %rcx, %rax			\$	]		
0x101d	je	e 0x1030						
0x101f	m	ulsd (%r9, %rdx, 8), %xmm0						
0×1025	a	ddsd (%r8, %rdx, 8), %xmm0						
0x102b	me	ovsd %xmm0, (%rdi, %rdx, 8)						
0×1030	a	ddq \$8, %rsp						
0x1034	p	opq %rbx						
0x1035	po	opq %rbp				_		
0×1036	re	etq				_		
0x1037	n	opw (%rax, %rax)						
0x1040	a	ddq \$1, %rax						
0x1044	x	orl %edx, %edx				_		
▼ 0×1046	jr	mp 0xf6a						-

The Session Info is under the Summary tab and displays more detail about the profiling session.

		AMDuProf - [/projects/bbka/slurc-19-2022_09-40-27]								
♠ PROFILE	SUMMAR	ANALYZE								٠
Hot Spots										
Session Information	Execution Details			System Details						
	Target Application:		/projects	/projects/bbka/slurm_test_scripts/cpu/stream/stream.22gb Machine Name: cn063.delta.internal.ncsa.edu						
	Worl	ing Directory:	/projects	/projects/bbka/slurm_test_scripts/cpu/stream CPU Family: 19h						
	Com	mand Line Argument	s:	CPU Model: 1h						
	Envir	onment Variables:		Core Count: 128						
	Core	Affinity:	0-127	-127 OS Information: LinuxRed Hat Enterprise Linux 8.4 (Ootpa)-64 1						
				4.18.0-305.57.1.el8_4.x86_64						
	Profile Details									
	Sess	on Type:	Time-base	Fime-based Sampling						
	Sess	on Scope:	Launch-A	Launch-Application						
	Sess	on Start Time:	Dec 19 20	Dec 19 2022   9:40:27 AM						
	Sess	on End Time:	Dec 19 20	Dec 19 2022   9:40:37 AM						
	Sess	on Duration:	9.675	).675						
	Oper	MP Tracing Enabled?	? No							
	Call 9	Stack Collected?	No							
	Sess	on DB Path:	/projects/ AMDuPro	bbka/slurm_test_scripts/cpu/stream/i f-stream-TBP_Dec-19-2022_09-40-27	.prof_tbp/					
	Eve	Events Monitored								
	Ever	nt		Mask	User	Kern	el	Interval		
	CPU	CPU_TIME		0x0	false	false	false 1ms			
						I				

# References:

https://www.amd.com/content/dam/amd/en/documents/developer/uprof-v4.0-gaGA-user-guide.pdf