Adaptive.hpc/ai/ml-as-a-service

User Guide 1.0

July 2024





Contents

Legal Notices	3
Adaptive.hpc/ai/ml-as-a-service Overview	4
Chapter 1: Running an On-Premises Interactive Job	5
Chapter 2: Deploying E4S in the Cloud	18

Legal Notices

Copyright © 2024. Adaptive Computing Enterprises, Inc. All rights reserved.

This documentation and related software are provided under a license agreement containing restrictions on use and disclosure and are protected by intellectual property laws. Except as expressly permitted in your license agreement or allowed by law, you may not use, copy, reproduce, translate, broadcast, modify, license, transmit, distribute, exhibit, perform, publish, or display any part, in any form, or by any means. Reverse engineering, disassembly, or decompilation of this software, unless required by law for interoperability, is prohibited.

This documentation and related software may provide access to or information about content, products, and services from third-parties. Adaptive Computing is not responsible for and expressly disclaims all warranties of any kind with respect to third-party content, products, and services unless otherwise set forth in an applicable agreement between you and Adaptive Computing. Adaptive Computing will not be responsible for any loss, costs, or damages incurred due to your access to or use of third-party content, products, or services, except as set forth in an applicable agreement between you and Adaptive Computing.

Adaptive Computing, Moab®, Moab HPC Suite, Moab Viewpoint, Moab Wide Area Grid, NODUS Cloud OS[™], On-Demand Data Center[™], and other Adaptive Computing products are either registered trademarks or trademarks of Adaptive Computing Enterprises, Inc. The Adaptive Computing logo is a trademark of Adaptive Computing Enterprises, Inc. All other company and product names may be trademarks of their respective companies.

The information contained herein is subject to change without notice and is not warranted to be error free. If you find any errors, please report them to us in writing.

Adaptive Computing Enterprises, Inc. 1100 5th Avenue South, Suite #201 Naples, FL 34102 +1 (239) 330-6093 www.adaptivecomputing.com

Adaptive.hpc/ai/ml-as-a-service Overview

Adaptive.hpc/ai/ml-as-a-service includes over 120+ open-source applications with additional frameworks, tools and packages optimized for GPUs and AI/ML workloads. The full Adaptive Computing Technology Stack is included and contains the Moab HPC Suite and ODDC (On-Demand Data Center) software, and cloud-based or on-premises supercomputing infrastructure.

For pricing information, contact us at sales@adaptivecomputing.com.

For support, contact us at support@adaptivecomputing.com.

Chapter 1: Running an On-Premises Interactive Job

Follow the steps below to run an on-premises (using Moab Node) interactive job using a precreated Viewpoint template.

1. Access the Viewpoint URL provided by Adaptive Computing. The **Login** screen appears:

Moab VIEWPOINT		
	Login	
	User Name	
	Password	
	LOGIN	
	Copyright $\bar{0}$ 2024 Adaptive Computing Enterprises, Inc. All rights reserved.	

2. Log in with the credentials provided by Adaptive Computing.

OME	WORKLO	AD	REPORTING	TEMPLATES	، ، ا	NODES	FILE MA	NAGER		SE	SSIONS	CONFIGURAT	ION
Vorklo	ad 🖻	ſ	Select Applicat	ion Template				Ш		×	Search: 1886 re:	ults returned	
		Submitter	Type	*		Filter	All	*	٩				~
40ab.1801	Remote_viz_job	oddcadmir	Remote Viz J	ob Test	2024/2/29		oddcadmin			•	Search		Q,
40ab.1800	Remote_viz_job	oddcadmir	Run Sleep Job	o on GPU Node	2024/2/29		oddcadmin						
40ab.1799	Remote_viz_job	oddcadmir	Start Interact	ive E4S On Pr	2024/7/12		oddcadmin			ι.	0		
xxxxeroff-1798	poweroff	root	Submit E4S o	n AWS Frankf	2024/7/8		oddcadmin				Queue Status -		
coveroff-1797	poweroff	root	Submit E4S o	n AWS with an	2024/5/13		awang				Job Type -		~
xxxeroff-1796	poweroff	root	Submit E4S o	n Azure with a	2024/3/26		awang						-
oweroff-1795	poweroff	root	Show 10 💙			-	1 2	3.	-		-	-	
oweroff-1794	poweroff	root									RESET	FILTER	
ower-1793	power	oddcadmie							Close				

3. Select the **Workload** tab and then select **Create Job**:

4. Select the template **Start Interactive E4S On Prem Session using A100 GPU**:

Moab	VIEWPOINT					Welcome, oddo	admin <u>Sign Out</u> 🗘 😯		
HOME	WORKLOAD	REPORTING	TEMPLATES	NODES	FILE MANAGER	SESSIONS	CONFIGURATION		
Create J	ob								
Start Inte	Start Interactive E4S On Prem Session using A100 GPU								
✓ Application	ion Description								
Welcon Select the app Have funl to	Welcome to our Remote Viz Application! Select the application you would like to launch and hit the submit button! Have fun! :o)								
♥ User Inp	uts								
	Application	Graphical Terminal		~					
						Cancel	CREATE		
			R.	Adaptive					
			Copyright © 2024 Adaptive Co	omputing Enterprises, Inc. A	Il rights reserved.				

5. Select the **Application** option **Graphical Terminal** and then click the **Create** button. The Interactive session starts as a Moab job:

Moab VIEV	WPOINT					Welcome, od	kadmin <u>Sign Out</u> O O
IOME V	VORKLOAD	REPORTING	TEMPLATES	NODES	FILE MANAGER	SESSIONS	CONFIGURATION
Remote_viz.job Status: ACTIVE Job Status: RUINNING Job Messages					sing A100.GPU (v.3)	Return to P Remote Viz 5 Screens	A cartier search Connel Session 3 hot is not available at this time
Credentials User oddcad Class None	inin Group Quality	oddcadmin Accou nof Service None	nt None *	CPU Stati	stics 18 Dedicated CPUs	M Utilaad CPUs	•
Time Frame							
Start Time	Duration		Completion Time		Actu	d Duration	
2024-07-18 16:14:	99:23.59	59	None		00:0	0:00:06	
Data Manager	nent			Oti	her Information		
	Execution Path	/home/oddcadmin/	•		Partition Access List	onprem	
	Output Path	/home/oddcadmin/	•		Start Count	1	
	Error Path	/home/oddcadmin/	•				

6. Click the **Workload** tab to view the interactive Moab job running:

Moab	VIEWPOI	NT							Welcome, oddc	odmin <u>Sign Out</u> 🗘 🖗
HOME	WORKLO	AD I	REPORTING	TEMPL	ATES	NODES	;	FILE MANAGER	SESSIONS	CONFIGURATION
Worklo	ad 🔊		1	Refresh Inter	val 15s	•	CREAT	TE JOB	Current Search: 1887	results returned
di dot	Job Name 🕴	Submitter ID	♦ <u>Start Date</u> ♦	Submit Date	Quese Status	Cores \$	Nodes \$	WallClock 0	Select -	*
Moab.1802	Remote_viz_job	oddcadmin	2024-07-18 16:14:36	2024-07-18 16:14:35		1	2	99:23:59:59	Narrow Search	Q
Moab.1801	Remote_viz_job	oddcadmin	2024-07-18 08:52:47	2024-07-18 08:52:46	COMPLETED	1	2	00:01:00:00	Filters	
Moab.1800	Remote_viz_job	oddcadmin	2024-07-12 15:42:36	2024-07-12 15:42:34	COMPLETED	1	2	00:01:00:00	- Select Oueue State	
Moab 1799	Remote_viz_job	oddcadmin	2024-07-11 13:42:29	2024-07-11 13:42:27	COMPLETED	1	2	00:01:00:00	- Server queue State	
poweroff-1798	poweroff	root	2024-07-11 13:42:27	2024-07-11 13:41:55	COMPLETED	2	2	00:00:20:00	- Select Job Type -	*
poweroff-1797	poweroff	root	2024-07-11 13:38:39	2024-07-11 13:38:07	COMPLETED	2	2	00:00:20:00	Select -	*
poweroff-1796	poweroff	root	2024-07-11 13:38:07	2024-07-11 13:37:35	COMPLETED	2	2	00:00:20:00	-	
poweroff-1795	poweroff	root	2024-07-11 13:35:23	2024-07-11 13:34:51	COMPLETED	2	2	00:00:20:00	RESET	FILTER
poweroff-1794	poweroff	root	2024-07-11 13:32:22	2024-07-11 13:32:20	COMPLETED	2	2	00:00:20:00		
power-1793	power	oddcadmin	2024-07-11	2024-07-11	COMPLETED	16	2	00:00:20:00		

7. Click the **Nodes** tab to view the Moab node (A100) being used:

Moab vie	WPOINT						Welcome, or	ldcadmin	Sign Out	0
HOME	WORKLOAD	REPORTIN	łG	TEMPLATES	NODES	FILE MANA	GER SESSIONS	CON	IFIGUR/	TION
Nodes @				Refresh Interval	15s •		Current Search: 13	results retu	urned	
Node ID	Status \$	Cores Availabl \$	Jobs	♦ <u>Utilization CP</u> ♦	Time to Live	Operational Ta	- Select -			~
() a100-1		15/16	1	6.25/0	N/A	N/A	Narrow Search			۹
100-2	DOWN	0/12	0	0/0	NA	N/A	Filters			
0 ac-dxc7-0-0		8/8	0	0/0	N/A	N/A	Select Status			-
0 <u>ac-dx(7-0-1</u>		8/8	0	0/0	N/A	N/A	Processors 0	≜ To		
0 ac-dcd6-0-0		8/8	0	0/0	N/A	N/A	CPU 0	\$ То	-	\$
ac-dcd6-0-1		8/8	0	0/0	N/A	N/A	Memory 0	\$ То	-	\$
0 ac-ec35-0-0	IDLE	8/8	0	0/0	N/A	N/A	RES	ετ	FILTE	R

8. Click the **Workload** tab, click the interactive job running (called Moab.xx), and then click the active **Job Id** link:

Moab VIEWPOINT					Welcome, odd	cadmin <u>Sign Out</u> 🗘 🕑
HOME WORKLOAD	REPORTING	TEMPLATES	NODES	FILE MANAGER	SESSIONS	CONFIGURATION
Remote_viz_job Status: ACTIVE Job Status: RUNNING	Job Det Job Id : M Submission S Reservation Template: S	ails © loab.1802 ścript: N/A Name: N/A tart Interactive E45.0	On Prem Session	using A100 GPU (v.31	Return to Remote Viz S Screenst S	tearlier search Cancel ession Ø not is not available at this time
Credentials			CPU Stat	istics		
User oddcadmin Group Class None Quality	oddcadmin Ac	v	1.00 0.75 0.25 0.25 0.25	16.15 Dedicated CPUs	16.16 Utilized CPUs	0

9. On the right side, hover over the option **Remote Viz Session**, click the blue arrow, and then click **Connect to Remote Session**. A new URL tab opens where the session on the Moab node will start (wait for the Graphical Terminal session to come up):



- ======= Ó 7 Û Ó 1 12MiB / 4864MiB | 14 0 | 1 Ó Ô 0 I Û OMiB / 8191MiB | L | Processes: I GPU CI PID Туре GPU GI Process name Memory I ID ID Usa I ge ======| No running processes found I [oddcadmin@a100-1 ~]\$
- 10. You can run nvidia-smi, for example, to see the Nvidia details:

11. From the terminal session cd /es4sonpremvm/E4S/24.02 to mount E4S from the E4S Appvm:

[oddcadmin@a100-1 24.02]\$ cd [oddcadmin@a100-1 ~]\$ cd /e4sonpremvm/E4S/24.02 [oddcadmin@a100-1 24.02]\$ ■

12. Then run singularity run -nv e4s-cuda80-x86_64-24.05.siff to load a Singularity container:

```
[oddcadmin@a100-1 24.02]$ ls -la
total 50818476
drwxr-xr-x 5 root root
                              118 Jul 2 18:54
                               32 Jul 2 14:36
drwxr-xr-x 4 root root
-rw-r--r-- 1 root root 52038107136 Jul 2 18:48 e4s-cuda80-x86_64-24.05.sif
drwxr-xr-x 23 root root
                             4096 Feb 12 10:50 examples
                              130 Mar 11 15:24 mpich
drwxr-xr-x 4 root root
                              49 Mar 14 17:00 singularity-connect-command
-rw-r--r-- 1 root root
                          4096 Mar 11 21:36 spack
drwxr-xr-x 11 root root
[oddcadmin@a100-1 24.02]$ singularity run --nv e4s-cuda80-x86_64-24.05.sif
Singularity>
```

13. Run spack find to view all prerequisite packages available:

py-cppy@1.2.1	xcb-util-wm@0.4.2	
py-cppy@1.2.1	xerces-c@3.2.5	
py-cppy@1.2.1	xextproto@7.3.0	
py-cryptography@41.0.3	xkbcomp@1.4.6	
py-cycler@0.11.0	xkbdata@1.0.1	
py-cycler@0.11.0	xproto@7.0.31	
py-cython@0,29,36	xrandr@1.5.2	
py-cython@0,29,36	xrandr@1.5.2	
py-cython@0,29,36	xtrans@1.5.0	
py-cython@3.0.8	xxd-standalone@8,2,1201	
py-cython@3.0.8	xyce@7.8.0	
py-cython@3.0.8	xz@5.4.6	
py-debugpy@1.6.7	yaml-cpp@0.6.3	
py-debugpy@1.6.7	yaml-cpp@0.7.0	
py-decorator@5,1,1	zfp@0.5.5	
py-decorator@5,1,1	zfp@0.5.5	
py-deephyper@0.6.0	zfp@1.0.0	
py-defusedxml@0.7.1	zlib-ng@2,1,6	
py-defusedxml@0.7.1	zsh@5,8	
py-deprecation@2,1,0	zstd@1.5.6	
py-deprecation@2,1,0	zstd@1.5.6	
py-dill@0.3.6	zstr@1.0.7	
=> 1054 installed packages		
Singularity>		

14. Run spack find -x to view the available E4S applications that can be loaded in your path:

ecp-data-vis-sdk@1.0	mpifileutils@0.11.1	tasmanian@8.0	
exago@1.6.0	nccmp@1.9.1.0	tau@2.33.2	
exago@1.6.0	nco@5.1.9	tau@2.33.2	
exaworks@0.1.0	nek5000@19.0	trilinos@13.0.1	
faode1@1.2108.1	nekbone@17.0	trilinos@15.1.1	
flecsi@2.2.1	netcdf-fortran@4.6.1	trilinos@15.1.1	
flecsi@2.2.1	netlib-scalapack@2.2.0	turbine@1.3.0	
flit@2.1.0	nrm@0,1,0	umap@2.1.0	
flux-core@0.61.2	nvhpc@24.3	umpire@2024.02.0	
flux-core@0.61.2	omega-h@9,34,13	umpire@2024.02.0	
fortrilinos@2.3.0	omega-h@9,34,13	unifyfs@2.0	
fpm@0.10.0	openfoam@2312	upcxx@2023.9.0	
gasnet@2023,9,0	openmpi@5.0.3	upcxx@2023.9.0	
ginkgo@1.7.0	openpmd-api@0,15,2	variorum@0.7.0	
ginkgo@1.7.0	papi@7.1.0	veloc@1.7	
globalarrays@5.8.2	papi@7.1.0	visit@3.3.3	
glvis@4.2	papyrus@1.0.2	vtk-m@2.0.0	
gmp@6.2.1	parallel-netcdf@1.12.3	vtk-m@2.1.0	
gotcha@1.0.6	paraview@5,12,0	wannier9003.1.0	
gptune@4.0.0	paraview@5,12.0	xyce@7.8.0	
gromacs@2024.1	parsec@3.0.2209	zfp@0.5.5	
gromacs@2024.1	parsec@3.0.2209	zfp@0.5.5	
183 installed pack	ages		
Singularity>			

15. Run spack find -x +cuda to view which of the available applications are GPU enabled:

Singularity> spack find -x +cuda						
linux-ubuntu22.04-	x86_64 / gcc@11.4.0					
adios202.10.0	heffte@2.4.0	petsc@3.21.0				
amrex@24.04	hpctoolkit@2024.01.1	py-torch@2,2,2				
arborx@1,6	hpx@1.9.1	raja@2024.02.0				
axom@0.9.0	hypre@2.31.0	slate@2023.11.05				
bricks@2023.08.25	kokkos@4.3.00	slepc@3.21.0				
cabana@0,6,0	kokkos-kernels@4.3.00	strumpack@7.2.0				
caliper@2.10.0	lammps@20230802.3	sundials@7.0.0				
chai@2024.02.0	lbann@0,104	superlu-dist@8.2.1				
cusz@0.3.1	legion@24.03.0	tasmanian@8.0				
dealii@9.5.1	libpressio@0.95.1	tau@2.33.2				
ecp-data-vis-sdk@1.0	magma@2.8.0	trilinos@15.1.1				
exago@1.6.0	mfem@4.6.0	umpire@2024.02.0				
flecsi@2,2,1	omega-h@9,34,13	upcxx@2023.9.0				
flux-core@0.61.2	papi@7.1.0	vtk-m@2.1.0				
ginkgo@1.7.0	paraview@5.12.0	zfp@0.5.5				
gromacs@2024.1	parsec@3.0.2209					
47 installed packa	ages					
Singularity>						

16. Run a find command, for example spack find openfoam to show if this application is available and the version of the application:



17. As an example of a graphical application, run cd examples and use one of the Application example files (e.g., if using tau, change to the directory cd examples/tau):

```
Singularity> cd examples/tau

Singularity> ls -la

total 520

drwxr-xr-x 2 root root 56 Mar 12 15:34 .

drwxr-xr-x 23 root root 4096 Feb 12 15:50 .

-rw-r--r-- 1 root root 518704 Sep 2 2020 demo.ppk

-rw-r--r-- 1 root root 56 Feb 12 15:50 fetch.sh

-rw-r--r-- 1 root root 9 Feb 12 15:50 .gitignore

Singularity>
```

18. You can use the demo output file in the above directory to view, using for example paraprof:

Singularity> ls -la			
total 520			
drwxr-xr-x 2 root root 56	Mar 1	2 15:34	
drwxr-xr-x 23 root root 4096	Feb 1	2 15:50	
-rw-rr 1 root root 518704	Sep	2 2020	demo.ppk
-rw-rr 1 root root 56	Feb 1	2 15:50	fetch.sh
-rw-rr 1 root root 9	Feb 1	2 15:50	.gitignore
Singularity> paraprof demo.ppk			

Here is a Graphical view using the example above:



19. To terminate the remote session, from the Viewpoint UI, select the **Sessions** tab:

Moab VIEWPOINT		Welcome, oddicadmin <u>Sten Out</u> O O
HOME WORKLOAD REPORTING	TEMPLATES NODES FILE MANAGER	SESSIONS CONFIGURATION
Remote Sessions ©	II I tome +	Filters: 1 results returned
		- Session Name -
		· bi dol. ·
		- Submitter Id -
Remote_viz.job		RESET FILTER
Show 8 v entries	- prov 1 mot -	
	CREATE SESSION	
	& Adaptive	
	Cappright & 2024 Adaption Camputing Enterprises, Inc. All rights reserved.	

20. Hover over the started session, and then select Terminate Session. The remote session is terminated and the interactive job completes:

Moab	VIEWPOI	NT							Welcome, oddca	dmin <u>Sign Out</u> 🗢 <table-cell></table-cell>	
HOME	WORKLO	AD RI	EPORTING	TEMPLA	res	NODES	;	FILE MANAGER	SESSIONS	CONFIGURATION	
Worklo	ad 🖻			Refresh Interva	al 15s		CREAT	TE JOB	Current Search: 1888 n	esults returned	
And a class	Job Name 0	Submitter ID \$	Start Date	Submit Date • 9	Duese Status 🕴	Cores \$	Nodes \$	Wall-Clock \$	- Select -	*	
Moab.1803	Remote_viz_job	oddcadmin	2024-07-18 16:43:23	2024-07-18 16:43:20	COMPLETED	1	2	00:01:00:00	Narrow Search	Q	
Moab.1802	Remote_viz_job	oddcadmin	2024-07-18 16:14:36	2024-07-18 16:14:35	COMPLETED	1	2	00:01:00:00	Filters		
Moab.1801	Remote_viz_job	oddcadmin	2024-07-18 08:52:47	2024-07-18 08:52:46	COMPLETED	1	2	00:01:00:00	- Select Queue Status		
Moab.1800	Remote_viz_job	oddcadmin	2024-07-12 15:42:36	2024-07-12 15:42:34	COMPLETED	1	2	00:01:00:00	- Series clocae status		
Moab.1799	Remote_viz_job	oddcadmin	2024-07-11 13:42:29	2024-07-11 13:42:27	COMPLETED	1	2	00:01:00:00	- Select Job Type -	*	
poweroff-1798	poweroff	root	2024-07-11 13:42:27	2024-07-11 13:41:55	COMPLETED	2	2	00:00:20:00	- Select -	~	
poweroff-1797	poweroff	root	2024-07-11 13:38:39	2024-07-11 13:38:07	COMPLETED	2	2	00:00:20:00			
poweroff-1796	poweroff	root	2024-07-11 13:38:07	2024-07-11 13:37:35	COMPLETED	2	2	00:00:20:00	RESET	FILTER	
			2024-07-11	2024-07-11							

Chapter 2: Deploying E4S in the Cloud

Follow the steps below to deploy E4S in the Cloud (using an AWS deployed cluster in ODDC, nodes in bursting mode/down) using a E4S application, and using a precreated Viewpoint template.

1. Access the Viewpoint URL provided by Adaptive Computing. The **Login** screen appears:

Moab VIEWPOINT		
	Login	
	User Name	
	Password	
	LOGIN	
	Copyright © 2024 Adaptive Computing Enterprises, Inc. All rights reserved.	

- 2. Log in with the credentials provided by Adaptive Computing.
- 3. Select the **Workload** tab and then select one of the following templates as desired:
 - Submit E4S on AWS with an application
 - Submit E4S on Azure with an application
 - Submit E4S on GCP with an application
 - Submit E4S on OCI with an application

In the example below, we are using AWS:

Moab 🗸	IEWPOINT					Welcome, oddc	admin <u>Sign.Qut</u> 🍳 🥹
HOME	WORKLOAD	REPORTING	TEMPLATES	NODES	FILE MANAGER	SESSIONS	CONFIGURATION
Create Job Submit E4S	on AWS wit	h an applicatior	n				
✤ Basic Setting	<u>75</u>						
Resources Numb T Core	er of Cores N Fotal Nodes 2 as Per Node 4	lodes with Core Count	• 				
E4S	Application	lytorch	~				
						Cancel	CREATE
			& A				
			Copyright © 2024 Adaptive Comp	uting Enterprises, Inc. All rig	ghts reserved.		

This shows information about the ODDC cluster, such as the number of nodes and how many cores are on each node.

4. From the **E4S Application** drop-down list, select the E4S Application to load in your path using spack.

5. Click the **Create** button to start the process of Moab sending a power on job to ODDC to start up the nodes in the AWS data center where the actual job is queued until the nodes are deployed, then the job runs using the two nodes:

Moab	VIEWPOI	NT							Welcome, oddca	idmin <u>Sign.Out</u> 🌣 🕑
HOME	WORKLO	AD R	EPORTING	TEMPL	ATES	NODES		FILE MANAGER	SESSIONS	CONFIGURATION
Worklo	ad 🖻			Refresh Inter	val 15s	•	CREAT	EJOB	Current Search: 1890	results returned
\$ <u>01.465</u>	Job Name 🕴 🌵	Submitter ID	Start Date	Submit Date	Queue Status	<u>Cores</u> \$	Nodes \$	Wall Clock	- Select -	~
power-1805	power	oddcadmin	2024-07-18 16:53:58	2024-07-18 16:53:58		8	2	00:00:20:00	Narrow Search	٩
Moab.1804	aws	oddcadmin	N/A	2024-07-18 16:53:56	ELIGIBLE	8	2	00:00:10:00	Filters	
Moab.1803	Remote_viz_job	oddcadmin	2024-07-18 16:43:23	2024-07-18 16:43:20	COMPLETED	1	2	00:01:00:00	- Salart Outra Statu	
Moab.1802	Remote_viz_job	oddcadmin	2024-07-18	2024-07-18 16:14:35	COMPLETED	1	2	00:01:00:00	- Select Queue Statu	3- •
Moab.1801	Remote_viz_job	oddcadmin	2024-07-18 08:52:47	2024-07-18 08:52:46	COMPLETED	1	2	00:01:00:00	- Select Job Type -	~
Moab.1800	Remote_viz_job	oddcadmin	2024-07-12 15:42:36	2024-07-12 15:42:34	COMPLETED	1	2	00:01:00:00	- Select -	~
Moab.1799	Remote_viz_job	oddcadmin	2024-07-11 13:42:29	2024-07-11 13:42:27	COMPLETED	1	2	00:01:00:00		
poweroff-1798	poweroff	root	2024-07-11 13:42:27	2024-07-11 13:41:55	COMPLETED	2	2	00:00:20:00	RESET	FILTER
poweroff-1797	poweroff	root	2024-07-11 13:38:39	2024-07-11 13:38:07	COMPLETED	2	2	00:00:20:00		

6. Access the ODDC URL provided by Adaptive Computing. The **Login** screen appears:

HPC Cloud On-Demand Data Cente	r		LOG IN TO YOUR	ACCOUNT
Idoptive Computing's On-Demand Data Center platform gives companies the oblio o spin up temporary or pensistent data center inhestructure resources quid nexpensively, and an-demand. This intelligent cloud management platform gi mendefate access to all concustational resources, whether on porenia or in the	ty je. es		Usernome *	
n any leading cloud provider.			Password*	62
eams can automatically deploy and build clusters in the cloud, automatically spplications on those clusters, and then terminate the cloud resources on a do veekly, or even hourly basis.	n 17.		LOG IN	
he I+PC Cloud On-Demand Data Center includes all of the necessary tools ravision compute power and run workloads in the cloud or on-premise. Access to rajor cloud providers is pre-configured and built into the interface (CLI or GUI).	to at	1 h	Forget possw	(bro
In-Demand Data Center 7.5.0				
			Don't have an a	sccount?
			CREATE AN AG	COUNT
			Need help-gettin	g storted?
			GET THE CODC QUIC	C START GUIDE

7. Log in with the credentials provided by Adaptive Computing.

8. Click the **Cluster Manager** tab:

2	Ô								Risson Venter Oddradeen - Adeo
	E Cluster N	lanager		(Q, Search			10	••
	State	Nome	Provider	Owner	Bursting	Nodes	Credential	Uptime	Actions
0 0	Conception and Available	ela-aco-secont	Competition (oddcadmin	custom	2	adaptivegcpdevcreds	3 months	0
-	Co. Available	als-aci-ashbura	1010	addcadmin	custom	1	adapaptivedevocicreds	2 manths	©
	Co Available	ala anes and	• ***	oddcadmin	custom	4	adaptiveszurenewcreds	4 months	©
	C Available	ala-ava-faikts	vitera.	oddcadmin	custom	2	awsadaptivedevcred	10 days	0
	Concentration	ets-ave-canade2	-	oddcadmin	custom	1	awsadaptivedevcred	36 minutes	0

9. Click the cluster Name link (in this case e4s-aws-canada3) to view details about the cluster:



10. Click the **Nodes** tab to view the cluster nodes deploying:

2	Ċ.						Rison Venter Oddoadens - Adeas
	Custers effect e4s-ows-canada3 Amazon Tinis Sentan				ets own const		0
е в	Cluster Info Queue Nodes	Configuration					7/18/24 18:49:18
0 0	III Cluster Nodes	Nama	Instance Type	State	Cores / Threads	Lood Avg.	Actions
= •	Al Nodes Day	oc-fefb-0-0		C Deploying	414	0.12	
	Avsistie O Depkying 2	ac-fefb-0-1		C Deploying	4:4	0.36	
	Cottine 0 Destroying 0 Down 0				Prom	sperpage: 30 × 1-2 of 2	< >

11. Click the **Configuration** tab and select the **Remote VNC client** check box:

8	Ċ.	Ricon Venter Oddaalmen - Adoor
	← Chuters e4s-aws-canada3 Ameran Vieb Sentes	els cons canada) • ©
*	Ouster Info Queue Nodes Configuration	7)18/24 18:50:23
0 0	Cluster Information	Cluster Compute Nodes
•	DownLoAd CLUSTER Sol DownLoAd CLUSTER Sol Kead Node Size: 12,400 pc - vCPU: 4, Mem (50): 16 xxv Head Node Size: 12,400 pc - vCPU: 4, Mem (50): 16 Exit CoLLAdosUNDR Courter ID 32 No. 10,800 Pc Court CoLLAdosUNDR	Size Count KLolorge - vCPU 4, Mem Sižit: 36 2
	SPH Uservanie (Jounta) SPH Uservanie (Jounta) Creted, July 18, 2024 6:09 PM Availability Zone: CA Central to	Disks Information
	Funds VNC cleat	None
		MANAGE DISKS

12. Click the **OPEN VNC VIEWER** button. A pop up session opens that is connected to the cluster head node, which is running a Ubuntu OS:



13. Click the **Connect** button:

	Conductinia	
	Credendals	
9C	Usemame:	
81		
	Passiond.	
el .		
	Servi Credentials	
	5410 01001000	
		·

14. Log in with the same credentials as your ODDC login. This connects to the head node on a Ubuntu Remote Desktop Session:



15. Now run the spack find, spack find -x, spack find -x +cuda, and spack find openfoam example commands as in the Viewpoint session:

Activit	ies 🔿 Terminal				Jul 18 22:42						Ø
6					oddcadmin@e4s-aws-canada	ð: -/Desktop					
	Freetpyel2.4.1 Freetpyel2.3.2 gandg202.3.8.0 gandg202.2.3.8.0 gaterp202.2.4.0 gaterp21.2.2 gttopp21.2.0 gttopp21.2.0 gttopp21.2.0 gttopp21.2.0 gttopp21.2.0 gttopp21.2.0 gttopp2.2.0 gttop	i Ubakhe i Ubakhe i Ubaren i U	oment[1,5,6 (Ver(1,1,2) (2,10,3,4 (2,10,3,4 (2,10,3,4) (2,1,3,4)\\(2,1,3,4)\\(2,1,3,4)\\(2,1,3,4)\\(2,1,3,4)\\(Py-backcalt(0, 2, 4, 5, 6, 6, 6, 9) Py-back(11, 1, 5, 6, 6, 6, 6, 1, 9) Py-back(11, 1, 5, 6, 6, 6, 1, 1, 9) Py-back(21, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1	12.2 By - Intel ² By By - B	netleg1.5.6 netleg1.5.6 hi00.10.5 g3.1 1.0.0 g0.4.12 g0.4.2 1.0.0 g0.4.2 1.0.0 1.0.	pp-tsrid(tps.12.1 pp-tsrid(tps.1.1) pp-tsrid(tps.1.1) pp-tspit(tps.1.6) pp-tspit(ts.6.1) pp-tspit(ts.6.1) pp-tspit(ts.6.1) pp-tspit(ts.1.6) pp-tspit(tspit(ts.1.6)) pp-tspit(tspit(tspit(ts))) pp-tspit(tspit(tspit(ts))) pp-tspit(tspit(ts))) pp-tspit(tspit(ts))) pp-tspit(tspit(ts))) pp-tspit(tspit(tspit(ts))) pp-tspit(tspit(ts))) pp-tspit(tspit(ts)))) pp-tspit(tspit(ts)))) pp-tspit(tspit(ts)))))))))))))))))))))))))))))))))))	x2(5.4.4) yest(2.420(0.7) z50(0.5.5) z7pe(0.5.5) z7pe(0.5.5) z7pe(0.5.6) z7pe(0.5.6) z10(0.4) z10(0.4) z10(0.4) z10(0.4) z10(0.4) z10(0.5.6)			
	Unix-abunti22.0 adias21.13.1 adias222.10.0 adias222.10.0	<pre>t-100_01 / gccg11.4.0 callperg2.10.0 callperg2.10.0 chalg2024.02.0</pre>	flecs102.2.1 flitp2.1.0 flux-coreg0.41.2	hdf5g1.14.3 hdf5-vol-async01.7 hdf5-vol-cachepv1.1	Lannas(202200002.3 Lbann(0.104 Legion(24.03.0	<pre>mplfilextilsp0.11.1 nccmp01.9.1.0 nccmp01.9.1.9</pre>	parsec01.0.2209 pdtg3.25.2 petscg3.21.0	rajag2024.02.0 rajag2024.02.0 revolg1.1.0	taug2.33.2 taug2.33.2 trilleosg13		
0	alustrian:	chalics:::02.6 charlic:loss::02.6 comoVite:0.9.1 comoVite:0.9.1 comoVite:0.9.1 comoVite:0.9.1 dersham-vutle:2.4.4 dersham-vutle:2.4.4 dersham-vutle:0.4 derlig:0.5.1 derlig:0.	flux-correge.41-2 fluxe-correge.41-2 fluxes/12-3.6 generet.2222.5.6 glukeges1.7.0 glukeges1.7.0 glukeges1.7.0 glukeges1.7.0 glukeges1.6.6 gstunegel.0.6 gstunegel.0.6 grunes.20224.1 grunes.20224.1 hdf5gl1.22.3	http:-wh-logil.6.8 http://whele.6.8 http://whele.6.8 http://whele.6.8 http://whele.6.8 http://whele.6.8 http://whele.6.8 http://whele.6 http:	Legino24.82.8 Liberatiyts.8.8.7 Liberatiyts.8.7 Liberatiyts.8.7 Liberasio0.55.1 Liberasio0.55.1 Liberasio1.6 Liberasio1.6 Liberasio1.6 Amercuryt2.3.1 mercuryt2.3	redboxeg17.0 metcdf-fortrambt.6.1 metcdf-fortrambt.6.1 metg01.0 mvbg226.3 openrot.00.0.1 openrot.00.0.1 openrot.00.0.1 pagt07.1.0 pagt07.0	retses:.:: plasma: plasma: plasma: prest(ces:) prest(ces: prest(ces:) prest(ces:) prest(ces:) prest(ces:) prest(ces:) prest(ces:) prest(ces:) prest(ces:) prest(ces:) prest(ces:) prest(ces:) prest(ces:) prest(ces:) prest(ces:) prest(ces:) prest(ces:) prest(ces:	scripto.s. statespace.s. statespace.s. statespace.s. strumpackip?.c.o sontlatsgr?.d. sontlatsgr?.d. soperlaudistgr?.d.	trillnessis trillnessis umpleelse umpleelse uptrajes uptr		
	oddcadhingeta-awa-ci 	<pre>indidi -/Derittungs spack i-sde_dd / gocgil.d.d. cabamaj0.d.d. ecg-dda caligerj2.ld.d exampli. taligerj2.ld.d exampli. taligerj2.ld.d exampli. taligers. fillen.s. fillen.exampli. taligers. mandoli.foreittungs spack i-sde_d gocgil.d.d - tage</pre>	find -x +cuda -vis-schult.0 granac 0.0 heffte -2.1 hefte #00.01.2 headi 17.0 hypeg find openfoan	 al2024.1 kokkos g2.4.0 Lekyas Mittg2024.21.1 Lekyas 9.1 Legian 2.31.0 Libpres 	H.3.00 negnej2 kernelsj4.3.00 nfenj4. 10230002.3 ngerdj2 124.03.0 pepter. 1510/0.95.1 peravte	.6.0 parsec[].0.22 6.0 petseg].11.0 202112-09 relacion 1.0 slategozi.11 wg5.12.0 struepackg7.1	<pre>199 sundlals@7.0.0 superlu-dist@8.2.1 0 tasnet.angu.0 1.05 taw[2.33.2 .0 trilinosgi5.1.1</pre>	umpireg2024.02.0 upcxg2023.9.0 vfk-ng2.1.0 zfpg0.5.5			

16. Do a cd and then a cd examples/tau as in the Viewpoint session:

	oddcadr/inge4s-aws-canada3s-/bes	ktop§ cd	
	oddcadn/inge4s-aws-canada31-5 od	examples/tau/	
	oddcadninge4s-aws-canada31-/exa	mples/tex5 is is	
	total \$24		
	drwwrwwr-x 2 oddcadmin oddcadm	in 4096 Jul 18 22:40 .	
	drwarwar-x 25 oddcadmts oddcadm	(n 4096 Jul 18 22:40	
	-rw-rw-r 1 oddcadmin oddcadm	in 9 Jul 18 22:40 .gitign	ere.
•••	-rw-rr 1 oddcadmin oddcadm	in 518764 Jul 18 22:40 demo.ppi	
	-resrunt-x 1 oddcadets oddcade	An 55 Jul 18 22:40 fetch.sl	
	addradel adeds - aut - canada't - ferm		

17. Use the demo file (as an example) to run in paraprof, showing the Paraprof Graphics rendering the demo file:



18. From the ODDC VNC session, close this session by first selecting **File** in the Paraprof session, select **Exit Paraprof**, do exit on the terminal session to get out of the terminal, select the options in the top-right of the Ubuntu desktop to select **Log Out**, then select the **Log Out** confirmation to close your VNC session:



19. After the cluster nodes deploy, click the **Nodes** tab. The job submitted from Viewpoint runs using the nodes and the nodes show busy while being used:

8	Ċ.							Risson Venter Celécolosis - Admin
	← Custers e4s-ows-conodo3 Amazen Web Services					et: :::::	enterno	•
*	Cluster Info Queue	Nodes	Configuration					7/18/24 18:52:20
0 0	Custer Nodes		Norme	Instance Type	Stote	Cores / Threads	Lood Aug.	Actions
•	 All Nodes Dely 		oc-fefb-0-0		🖵 Bury	0:4	1.15	
	Available Deploying		oc-fefb-0-1		🖵 Busy	0:4	6.39	
	C Offine C C C C C C C C C C C C C C C C C C C						Rows per page: 30 * 1-3	1af2 < >

20. While the job is using the nodes, select the **Queue** tab to view the job being run on the node:

\$	Ô						Risson Venter Oddisalmin - Admin
	← Custers e41-ows-conoido3 Anacer Web Services				ets ave caledad		0
•	Cluster Info Queue Nodes	Configuration					7/18/24 18:53:10
0	= Workload	ID Name	State	Submitted	Cares	Nodes	Actions
	All John 1 Durand 0	1808 gwrs	🕴 Running	July 18, 2024 6:52 PM		2	\otimes
	é Running I () Completed ()				Rows pe	page 10 = 1-1.0	1 ← >

When the job has completed on the nodes, the nodes show available again and ODDC terminates the nodes automatically after the idle purge time set in Moab expires, then the nodes are terminated:

Ċ.								Rioon Ventar Oddaaless-Adeas	
Clusters e4s-aws-conado Amazer Web Services	+ Cuaters e4s-aws-conada3 Amure Web tensor Amure Web tensor								
Cluster Info Queue		lodes	Configuration					7/28/24 18:54:13	
Custer Nodes			Name	Instance Type	State	Cores / Threads	Lood Aug.	Actions	
 Al Nodes Duty 	2		oc-fefb-0-0		Q Available	4:4	0.95		
Available Deploying	2		ac-fefb-0-1		Available	414	0.34		
Contine Control Destroying	0						tows per page: 10 ¥ 1-2	arz < >	
	Custor lots Custor lots Custor lots Custor lots Custor lots Custor lots Custor Nodes Custor N	Custor Info Custor Info Cust				• Catars • Catars	 Custor Custor Info Queen Name Indexes Type State Control Info Queen Reserve Antipartion Custor Info Queen Reserve Antipartion Custor Info Custor Info Queen Reserve Antipartion Custor Info <licustor info<="" li=""> Custor In</licustor>	Custor Custor Modes Modes Custor Modes Modes Custor Mode Custor Modes Load Allege Load Load Load Load	

Now the nodes are being terminated automatically on the Cloud provider:

Ô						Riccon Venter Oddinadmin-Admin
 ← Chuters ●4s-aws-canada3 Ansara Veb Services 				ets over care	+ 100	•
Ouster Info Quese Nodes	Configuration					7/18/24 18:59:38
Cluster Nodes	Nome	Instance Type	State	Cores / Threads	Lood Aug.	Actions
S Al Nodes 2	ac-fefb-0-0			4:4	0.15	
Avsibble O Displaying O	ac-fefb-0-1) Destroying	4:4	0.82	
Offline O Orstroying Z Onen O				Per	ws.per.page: 10 = 1-2	42 < >
	Custer Info Custer Nodes Custer Info Custer Nodes Custer Nodes Al Nodes Custer Nodes Custer Nodes Custer Nodes Custer Nodes Custer Nodes Custer Nodes Custer Nod	Custer Info Custer Nodes Custer Info Custer Nodes Custer Nodes Custer Nodes Custer Nodes Custer Nodes Custer Nodes Custer Nodes Custer Nodes Custer Nodes Custer	Custor loss Cust	Custor Info Custor Info Custor Nodes Custor Nodes Cus		Image: Cluster Nodes 0 Nome Nome Nome Sole Cover, Threads Lood Ang. Image: Cluster Nodes 0 Nome Nome Nome Sole Cover, Threads Lood Ang. Image: Cluster Nodes 0 0 Destroying 4:4 0.15 Image: Open of the

Now the nodes are down until the next set of workloads is sent to it:

S.	Ô									Rison Venter Oddadmin - Admin
		Conters ets-ows-conodo3 Ansart Hot Sensor								•
* 8		Chuster Info Que		lodes	Configuration					7/18/24 19:01:06
		Cluster Nodes			Name	Instance Type	State	Cores / Threads	Lood Avg.	Actions
		All Nodes 2 Duty 0	2		oc-fefb-0-0		😡 Down	4:4	0.2	
		Avoloble Doploying	•		oc-fefb-0-1		😡 Down	4:4	0.44	
		Continue Controying Count	0 0 2						Rows per page: 10 + 1-2	of2 < >