Open Composer: A web application for simplifying job submission on HPC clusters

Masahiro Nakao and Keiji Yamamoto (RIKEN Center for Computational Science)

R-CCS

Background

High learning cost for HPC clusters

- Install and configure a terminal software
- Generate an SSH key pair and register the public key
- Learn command line such as bash
- Learn how to use a job scheduler for submitting batch jobs

Web portal Open OnDemand for HPC clusters

- Open source software developed by Ohio State University
- Access HPC clusters from your web browser instead of SSH
- Execute interactive jobs with GUIs, perform file operations, upload/download data, and connect by a web terminal
- Used as the de facto standard around the world
- Run other web applications on Open OnDemand





Open Composer

https://github.com/RIKEN-RCCS/ OpenComposer

Features

- Web application to generate and submit job scripts on Open OnDemand
- Easy to deploy in any Open OnDemand sites
- Generate job scripts by entering parameters into a web form prepared for each application
- Reduce the learning cost for job schedulers and mistakes in writing job

Application page

- Generate a job script
- When entering values in the web form on the left side, a job script is dynamically generated in the text area on the right side
- When clicking "Submit" button, the script is submitted to a job scheduler

Top Application - History Open OnDema				
test	Script Location*			
	/home/rccs-aot/a03011	Select Path		

scripts

• Consist of Top page, History page, and Application page

Top page

- Registered applications are displayed by category
- Clicking on an icon navigates you to the respective Application page

Top Application - History					Open OnDemand
Climate					
SCALE					
Computer Aided Engineerin	g				
FDS	FFVHC-ACE	Front FrontFlow	FrontISTR	OpenFOAM OpenFOAM	
Condensed Matter Physics					
AkaiKKR AkaiKKR	ALAMODE	HØ	mVMC	OpenMX	PHASE/0 PHASE/0
	SALMON				
Quantum Espresso	SALMON				

			Script Name*	JUD Name		
			job.sh	test		
Queue			Script Contents			
🔾 small 🛛 large			#!/bin/bash			
Max hours (0-24)	Max minutes (0-59)		#PJM -L "rscgrp=small" #PJM -L "elapse=1:0:00"			
1	O	٢	<pre>#PJM -L "node=4"</pre>			
Number of nodes (1 - 128)			mpiexec /home/rccs-aot/a(cs-aot/a03011/a.out		
-						
Executable binary						
/home/rccs-aot/a03011/a.c	out	Select Path		Submit		
orm:			nodes:			
orm: queue :			nodes: widget: number			
orm: queue : widget: radio			nodes: widget: number label: Number of r	nodes (1 - 128)		
form: queue : widget: radio label: Queue			nodes: widget: number label: Number of r value: 4 min: 1	nodes (1 - 128)		
form: queue : widget: radio label: Queue value: small direction: horizon	ıtal		nodes: widget: number label: Number of r value: 4 min: 1 max: 128	nodes (1 - 128)		
Form: queue: widget: radio label: Queue value: small direction: horizont options:	ıtal		nodes: widget: number label: Number of r value: 4 min: 1 max: 128 step: 1	nodes (1 - 128)		
Form: queue : widget: radio label: Queue value: small direction: horizont options: - [small]	ıtal		nodes: widget: number label: Number of r value: 4 min: 1 max: 128 step: 1 binary:	nodes (1 - 128)		
form: queue : widget: radio label: Queue value: small direction: horizon options: - [small] - [large]	ıtal		nodes: widget: number label: Number of r value: 4 min: 1 max: 128 step: 1 binary: widget: path	nodes (1 - 128)		
Form: queue : widget: radio label: Queue value: small direction: horizon options: - [small] - [large] time: widget: number	ıtal		nodes: widget: number label: Number of r value: 4 min: 1 max: 128 step: 1 binary: widget: path label: Executable	nodes (1 - 128) binary		

History page

- Display execution status of job history and stop currently running jobs
- Reuse parameters from your job

Top Application - History								
							Filter	
Cancel job 💿 Delete info 💿							eued 🔵 Completed	
	Job ID	Application	Partition	Script Location	Script Name	Job Name	Submission at	Status
	<u>36366012</u>	GENESIS	small-s5	/home/rccs-aot/a03011 >-	j <u>ob.sh</u>	job.sh	2025/01/11 15:02:09	Completed
	<u>36345839</u>	GENESIS	small-s5	/home/rccs-aot/a03011 >-	j <u>ob.sh</u>	job.sh	2025/01/10 15:39:57	Completed
	<u>36345567</u>	GENESIS	small-s5	/home/rccs-aot/a03011 >-	j <u>ob.sh</u>	job.sh	2025/01/10 15:20:36	Completed
	<u>36124379</u>	FDS	small-s3	/home/rccs-aot/a03011/FDS/ №	j <u>ob.sh</u>	test	2024/12/26 17:44:34	Completed
	<u>36124193</u>	FDS	small-s3	/home/rccs-aot/a03011/FDS/ ≥	j <u>ob.sh</u>	test	2024/12/26 17:16:17	Completed
	<u>36124182</u>	FDS	small-s3	/home/rccs-aot/a03011/FDS/ ≥	j <u>ob.sh</u>	test	2024/12/26 17:13:04	Completed
	<u>36124115</u>	FDS	small-s3	/home/rccs-aot/a03011/FDS/ №	j <u>ob.sh</u>	test	2024/12/26 17:05:26	Completed
	<u>36124100</u>	FDS	small-s3	/home/rccs-aot/a03011/FDS/ >=	j <u>ob.sh</u>	job.sh	2024/12/26 17:03:09	Completed

label: [Max hours (0-24), Max minutes (0-59)]	#!/bin/bash
value: [1, 0]	#PJM -L "rscgrp= #{queue} "
min: [0, 0]	#PJM -L "elapse=#{time_1}:#{time_2}:00"
max: [24, 59]	#PJM -L "node=#{nodes}"
step: [1, 1]	mpiexec #{binary}

- Widgets for various applications
 - number: Enter a number
 - text: Enter text
 - email: Enter an email address
- select: Select one item from the select box
- multi_select: Select multiple items from the select box
- radio: Select one item from the radio buttons
- checkbox: Select multiple items from the checkboxes
 path: Select a path of a file or directory on the server