Open Composer: A web application for generating and managing batch jobs on HPC clusters

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Background

High learning cost for HPC clusters

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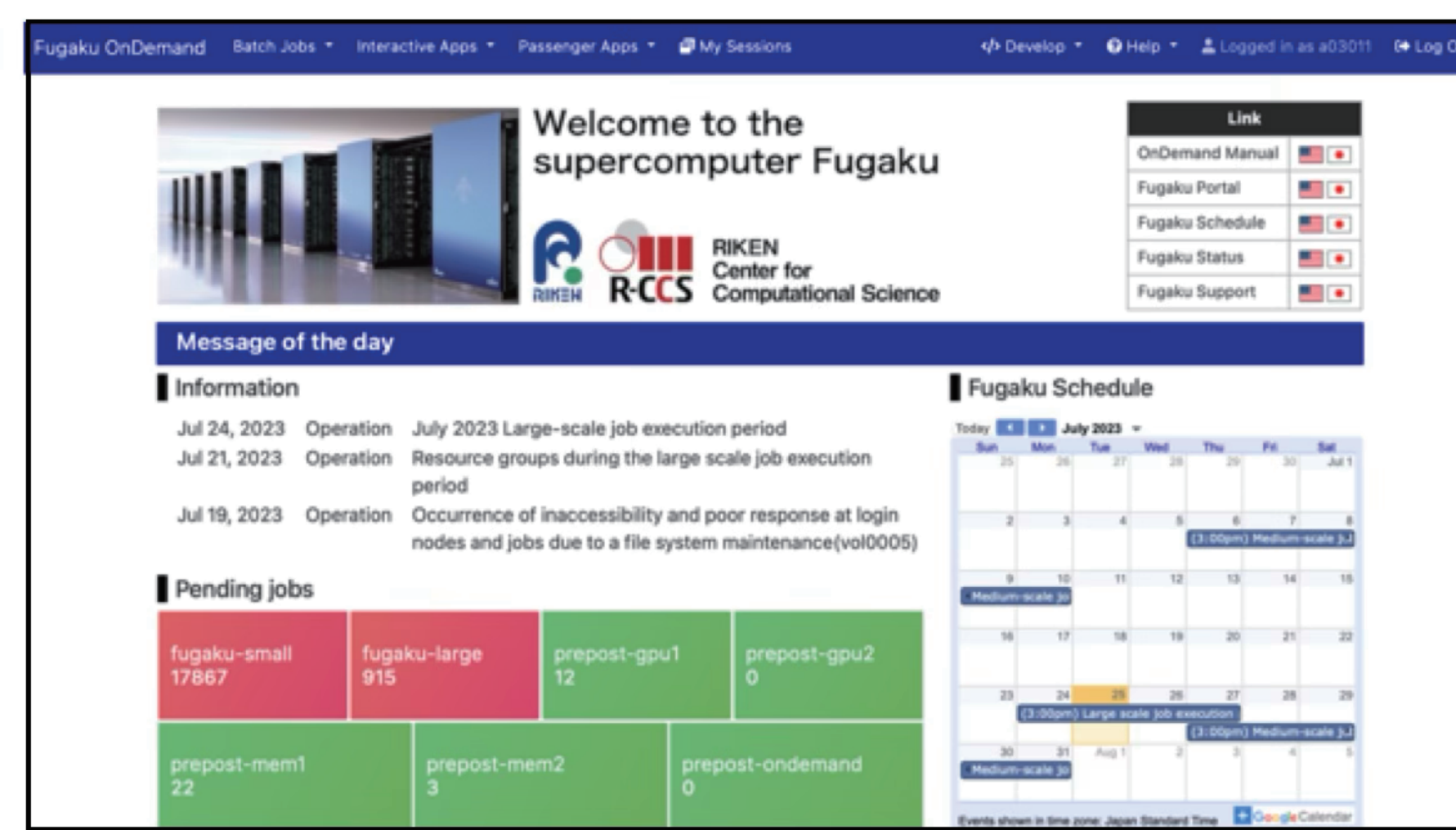- Learn how to use a job scheduler for submitting batch jobs

```
#!/bin/bash
#PJM -L "rscgrp=small"
#PJM -L "elapse=1:0:00"
#PJM -L "node=4"
mpiexec ./a.out
```

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 GUI, perform file operations, upload/download data, and connect by a web terminal
- **Run other web applications on Open OnDemand**

> Open OnDemand is used in HPC clusters worldwide

Open Composer

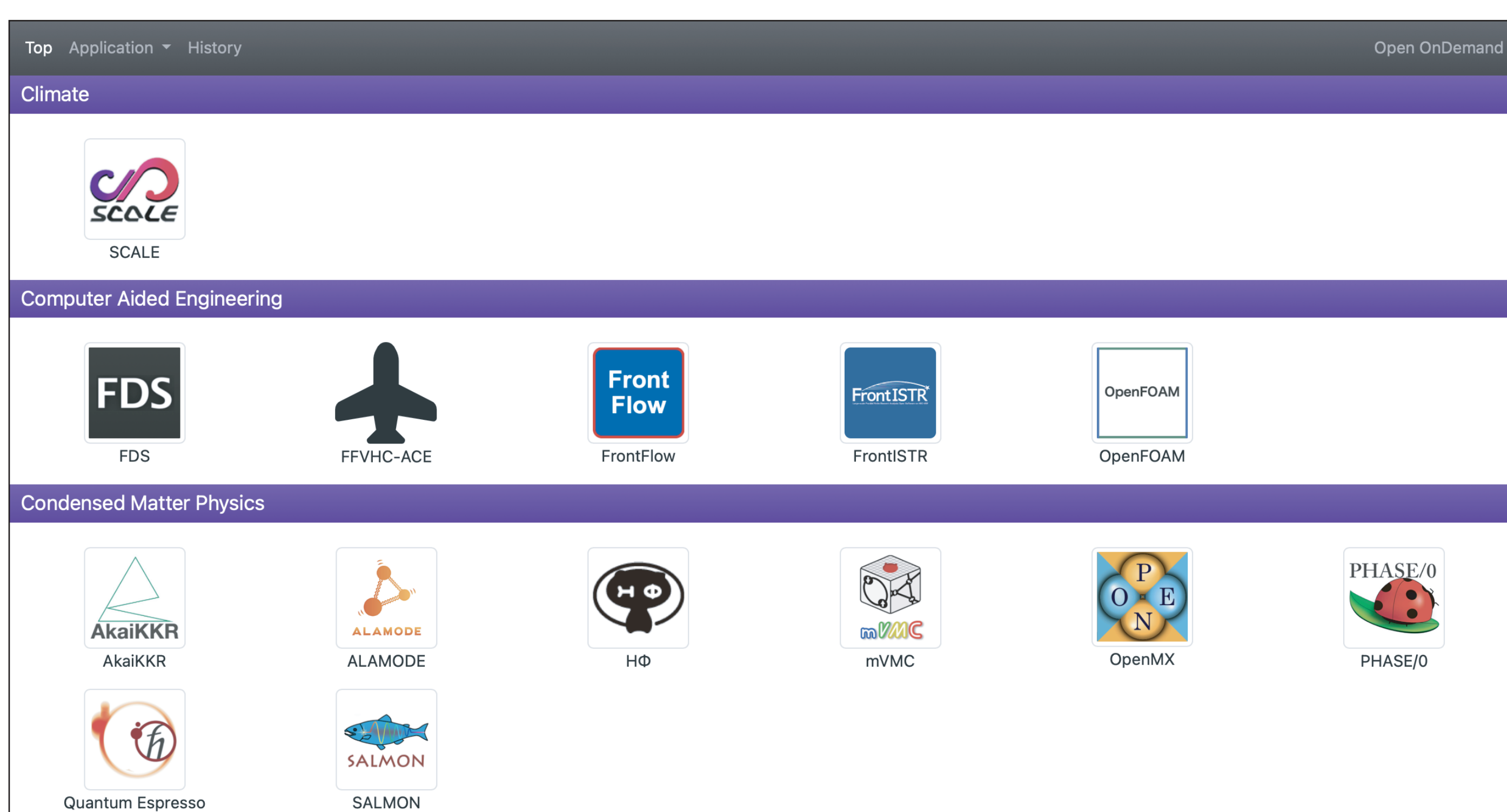https://github.com/RIKEN-RCCS/OpenComposer

Features

- Web application to generate and submit batch job scripts
- Easy to deploy in any Open OnDemand sites
- Generate batch job scripts by entering parameters into a web form prepared for each application
- Reduce the learning cost for job schedulers and mistakes in writing batch job scripts
- Consist of **Top page**, **History page**, and **Application page**

Top page

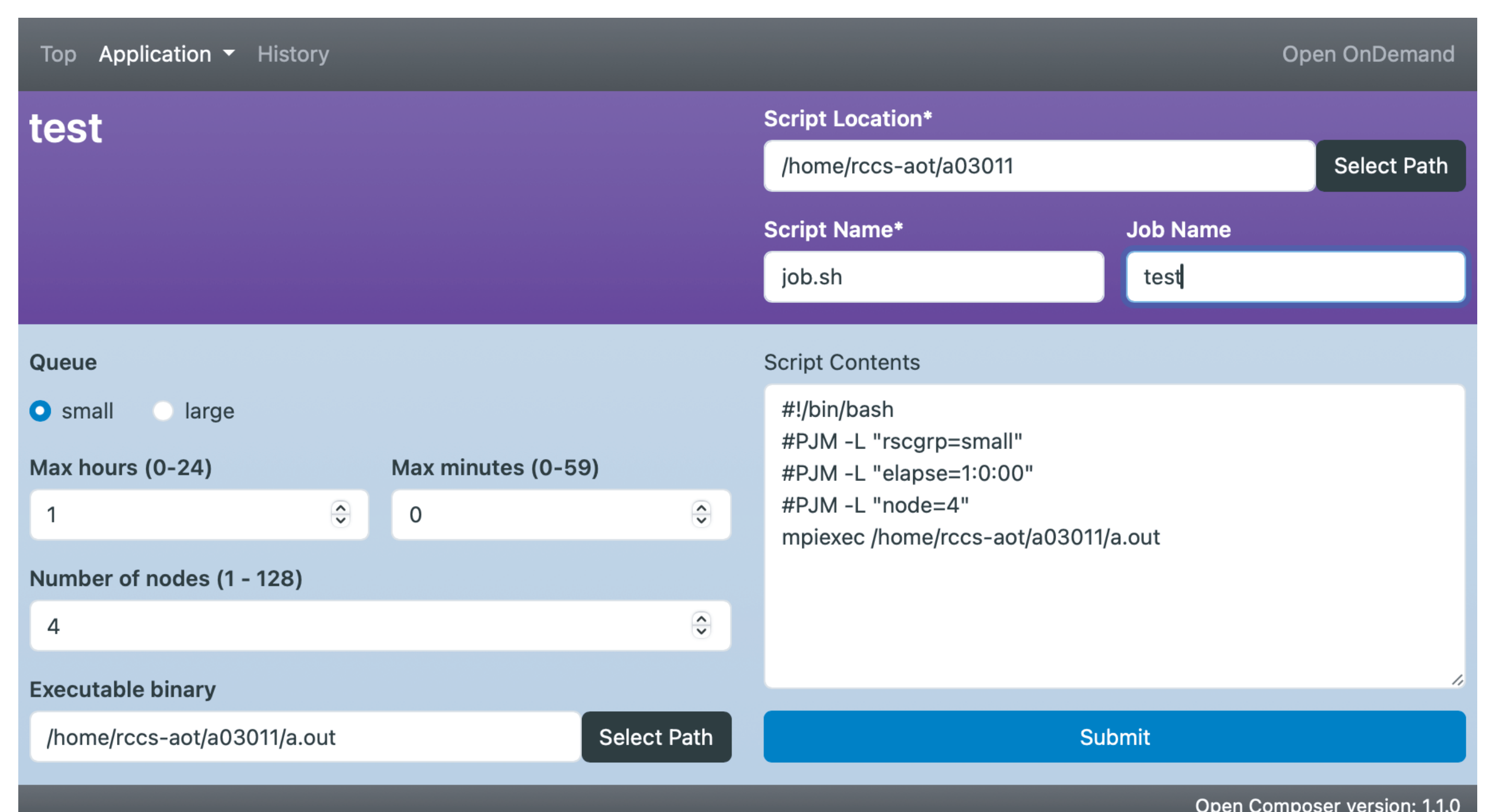Navigates you to the respective **Application page**.

History page

Display execution status and delete running jobs.

	Job ID	Application	Partition	Script Location	Script Name	Job Name	Submission at	Status
	36366012	GENESIS	small-s5	/home/rccs-aot/a03011	job.sh	job.sh	2025/01/11 15:02:09	Completed
	36345839	GENESIS	small-s5	/home/rccs-aot/a03011	job.sh	job.sh	2025/01/10 15:39:57	Completed
	36345567	GENESIS	small-s5	/home/rccs-aot/a03011	job.sh	job.sh	2025/01/10 15:20:36	Completed
	36124379	FDS	small-s3	/home/rccs-aot/a03011/FDS/	job.sh	test	2024/12/26 17:44:34	Completed
	36124193	FDS	small-s3	/home/rccs-aot/a03011/FDS/	job.sh	test	2024/12/26 17:16:17	Completed
	36124182	FDS	small-s3	/home/rccs-aot/a03011/FDS/	job.sh	test	2024/12/26 17:13:04	Completed
	36124115	FDS	small-s3	/home/rccs-aot/a03011/FDS/	job.sh	test	2024/12/26 17:05:26	Completed
	36124100	FDS	small-s3	/home/rccs-aot/a03011/FDS/	job.sh	job.sh	2024/12/26 17:03:09	Completed

Application page

When entering values in the left side, a batch job script is dynamically generated in the right text area. When clicking "Submit" button, the script is submitted to a job scheduler.

```
form:
  queue:
    widget: radio
    label: Queue
    value: small
    direction: horizontal
    options:
      - [small]
      - [large]
  time:
    widget: number
    size: 2
    label: [Max hours (0-24), Max minutes (0-59)]
    value: [ 1, 0]
    min: [ 0, 0]
    max: [24, 59]
    step: [ 1, 1]
  nodes:
    widget: number
    label: Number of nodes (1 - 128)
    value: 4
    min: 1
    max: 128
    step: 1
  binary:
    widget: path
    label: Executable binary

script: |
  #!/bin/bash
  #PJM -L "rscgrp=#{queue}"
  #PJM -L "elapse=#{time_1}:#{time_2}:00"
  #PJM -L "node=#{nodes}"
  mpiexec #{binary}
```

There are widgets available for a variety of 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