

Github Actions

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Create and maintain github actions on SCOREC

AGENDA

2

01 What are github actions?

04 Composite Actions

02 Navigating website

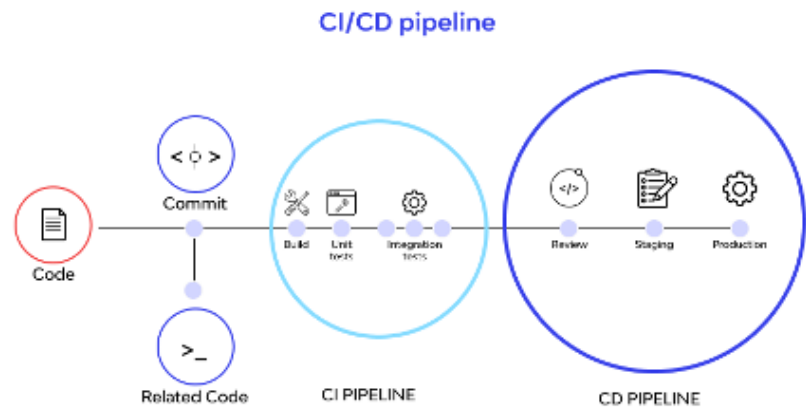
05 Globus Compute

03 Demo

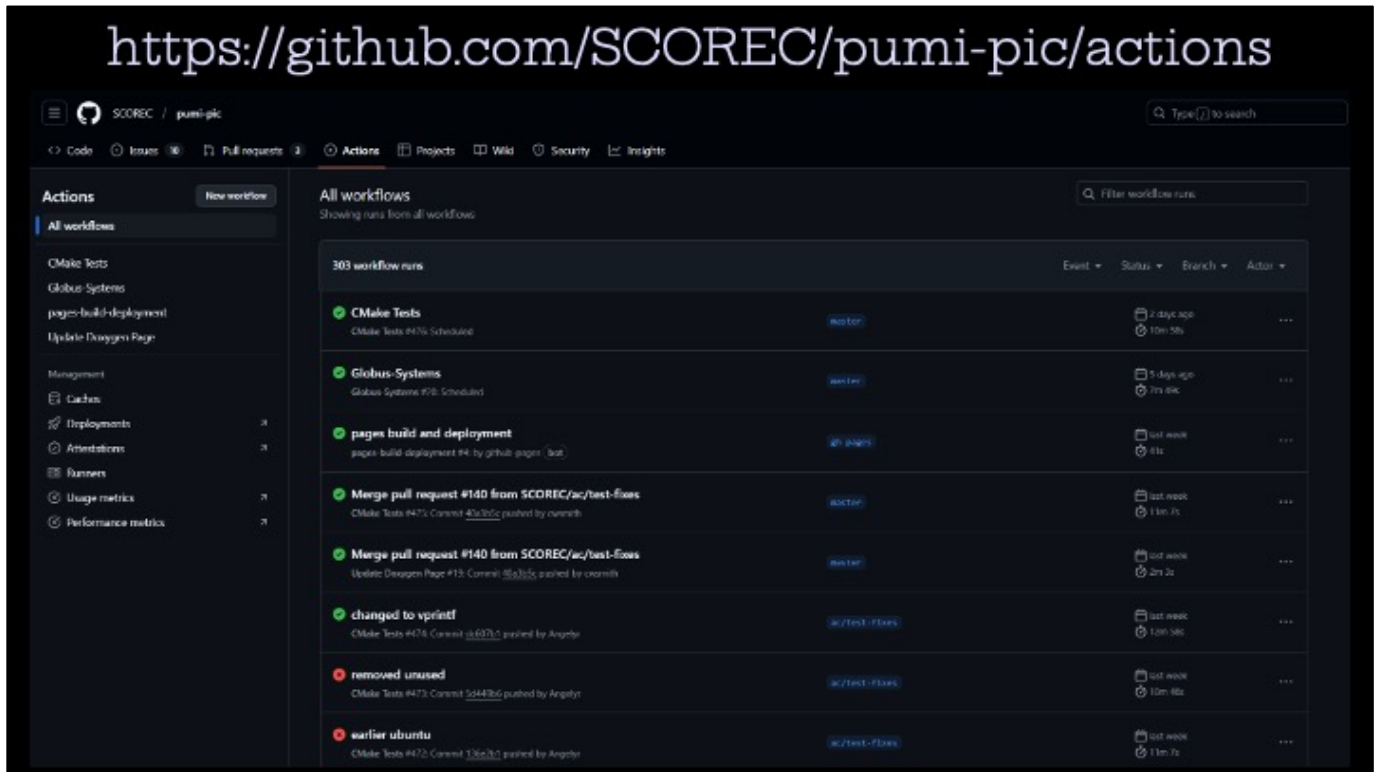
06 HW Time

What are github actions?

1. **Goal:** Automate different steps in development to reduce bugs, downtime, and manual work.
2. **Continuous Integration (CI):** Run builds and tests on many systems automatically to save developers time.
3. **Continuous Deployment (CD):** Reduce down time in bringing changes to users.
4. **Documentation:** <https://docs.github.com/en/actions>



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Github Repo
 Actions Tab
 All Workflows Tab

Left

- **Workflows:** set of jobs to run
- **Caches:** archive to store data between workflow runs
- **Runners:** set of computers that your workflows

Right

1. Workflow runs
2. Name of workflow
3. Pass or fail
4. How it triggered
5. Branch origin
6. When it ran / How long it took



<https://github.com/Angelyr/Class/blob/main/.github/workflows/cmake-tests.yml>

Valgrind: avoid memory leaks

Composite Actions

```
49 name: build kokkos
50 uses: ./github/actions/install-repo
51 with:
52   repo-name: 'kokkos'
53   repo-path: 'kokkos/kokkos'
54   repo-ref: '4.2.00'
55   cache: true
56   options: '-DOWAS_CXX_COMPILER=${{ matrix.compiler }}
57           -Dkokkos_ENABLE_CUDA=ON
58           -Dkokkos_ENABLE_CUDA_CXX=OFF
59           -Dkokkos_ENABLE_CUDA_UBO=OFF
60           -Dkokkos_ENABLE_CUDA_LAPACK=OFF
61           -Dkokkos_ENABLE_CUDA_HIP=OFF'
```

```
54 - name: build omega_h
55 uses: ./github/actions/install-repo
56 with:
57   repo-name: 'omega_h'
58   repo-path: 'SCOREC/omega_h'
59   repo-ref: ''
60   cache: true
61   options: '-DOWAS_BUILD_TYPE=Release
62           -DOWAS_SHARED_LIBS=OFF
63           -Domega_h_USE_Kokkos=ON
64           -Domega_h_USE_CUDA=OFF
65           -Domega_h_USE_MPI=ON
66           -DOWAS_ENABLE_MPI=ON
67           -DOWAS_ENABLE_MPI=OFF
68           -DOWAS_C_COMPILER=mpicc
69           -DOWAS_CXX_COMPILER=mpicxx
70           -Dkokkos_PREFIX=${{ runner.temp }}/build-kokkos/install/lib/cmake'
```

```
1 name: Install-repo
2
3 inputs:
4   repo-name:
5     required: true
6   repo-path:
7     required: true
8   repo-ref:
9     required: true
10  options:
11    required: true
12  cache:
13    required: true
14  submodules:
15    default: ''
16
17 runs:
18   using: "composite"
19   steps:
20
21   - name: Check Cache
22     if: ${{ inputs.cache == 'true' }}
23     uses: actions/cache@v3
24     id: check-cache
25     with:
26       key: build-${{ inputs.repo-name }}
27       path: ${{ runner.temp }}/build-${{ inputs.repo-name }}
28
29   - name: Checkout Repo
30     uses: actions/checkout@v3
31     with:
32       repository: ${{ inputs.repo-path }}
33       submodules: ${{ inputs.submodules }}
34       ref: ${{ inputs.repo-ref }}
35       path: ${{ inputs.repo-name }}
36
37   - name: Configure Cmake
38     if: ${{ !steps.check-cache.outputs.cache-hit }}
39     shell: bash
40     run: cmake -S ${{ github.workspace }}/${{ inputs.repo-name }} -B ${{ runner.temp }}/build-${{ inputs.repo-name }}
41           -DOWAS_INSTALL_PREFIX=${{ runner.temp }}/build-${{ inputs.repo-name }}/install
42           ${{ inputs.options }}
43
44   - name: Build Cmake
45     if: ${{ !steps.check-cache.outputs.cache-hit }}
46     shell: bash
47     run: cmake --build ${{ runner.temp }}/build-${{ inputs.repo-name }} --target install
```

<https://github.com/SCOREC/pumi-pic/blob/master/.github/workflows/cmake.yml>

<https://github.com/SCOREC/pumi-pic/blob/master/.github/actions/install-repo/action.yml>

Advanced

- 1. Composite Action:** a collection of reusable steps in a workflow run
- 2. uses:** points to composite actions or reusable workflows. Either custom or made by github
- 3. with:**
 - a. used to pass in variables to actions
 - b. **Required:** github will return an error if the variable is not passed in
 - c. **Default:** optional variable that will evaluate to a default value if the user does not pass one in
 - d. **Input:** list of variables that a composite action can take
- 4. Cache:** store files to be reused in the future
- 5. Conditionals:** can be used to skip steps in a workflow run
- 6. Variables**
 - a. **\${{ }}**: used to evaluate github variables.
 - b. Github
 - i. **runner.temp:** default github variable pointing to the temporary

directory that the runner is using

ii. **\$GITHUB_WORKSPACE**: default directory for the github checkout action

a. **env**: defines an environment variable that can be used by a step or a workflow

Globus Compute

```
1 name: globus-systems
2 on:
3   schedule:
4     - Monday 0:00 UTC or 01:00 EDT
5     - cron: '35 5 * * 1'
6
7 jobs:
8   permutation-test:
9     uses: SCOREC/github-actions/.github/workflows/globus-test.yml@main
10    secrets: inherit
11    with:
12      machine: "permutation"
13
14   frontier-test:
15     uses: SCOREC/github-actions/.github/workflows/globus-test.yml@main
16    secrets: inherit
17    with:
18      machine: "frontier"
```

```
1 name: Globus-Systems
2
3 on:
4   workflow_call:
5     inputs:
6       machines:
7         required: true
8         type: string
9
10 concurrency:
11   group: system-${{ inputs.machines }}
12   cancel-in-progress: true
13
14 jobs:
15   run-globus:
16     runs-on: ubuntu-latest
17     timeout-minutes: 30
18
19     steps:
20
21     - name: checkout repo
22       uses: actions/checkout@
23
24     - name: checkout globus file
25       uses: actions/checkout@
26       with:
27         repository: SCOREC/globus-actions
28         path: .github/workflows/globus
29         sparse-checkout: |
30           run-globus.py
31         sparse-checkout-cone-mode: false
32
33     - name: setup python
34       uses: actions/setup-python@
35       with:
36         python-version: '3.10'
37
38     - name: install packing
39       run: sudo apt install python3-packaging
40
41     - name: install globus
42       run: |
43         python -m ensurepip --upgrade --user
44         python -m pip install globus-compute-endpoint
45
46     - name: use globus
47       working-directory: .github/workflows
48       env:
49         GLOBUS_ID: ${{ secrets.GLOBUS_COMPUTE_ID }}
50         GLOBUS_SECRET: ${{ secrets.GLOBUS_COMPUTE_SECRET }}
51       run: |
52         export GLOBUS_COMPUTE_CLIENT_ID="${GLOBUS_ID}"
53         export GLOBUS_COMPUTE_SECRET="${GLOBUS_SECRET}"
54         if [ ${{ inputs.machines }} == "permutation" ]; then TARGET_ENDPOINT=00000000-0000-0000-0000-000000000000; fi
55         if [ ${{ inputs.machines }} == "frontier" ]; then TARGET_ENDPOINT=00000000-0000-0000-0000-000000000000; fi
56         python globus/run-globus.py ${{ inputs.machines }} ${{ github.event.repository.name }} ${{ github.sha }} $TARGET_ENDPOINT
```

<https://github.com/SCOREC/pumi-pic/blob/master/.github/workflows/globus-test.yml>

<https://github.com/SCOREC/github-actions/blob/main/.github/workflows/globus-test.yml>

Advanced Example

1. Globus Compute:

- server on computer listening for information
- Validated by globus compute
- Require user and secret to authenticate

2. schedule - used to preserve resources

3. crontab: <https://crontab.guru/>

4. multiple jobs run concurrently

5. uses: can run workflows in other repos or other files in the same repo

6. secrets: used for authentication

7. with: used to pass in variables

8. workflow_call:

- Reusable workflow
- Script with multiple steps that can be reused
- inputs: custom variables passed into the workflow

9. concurrency:

- a. Prevent multiple jobs from running at the same time
- b. Useful because my account prevents only allows one job at a time
- c. group: will prevent multiple jobs with this name from running at the same time

1. **working-directory:** will run current step in named directory

HW

Questions?