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Create and maintain github actions on SCOREC

AGENDA

01 What are github actions?

02 Navigating website

03 Demo

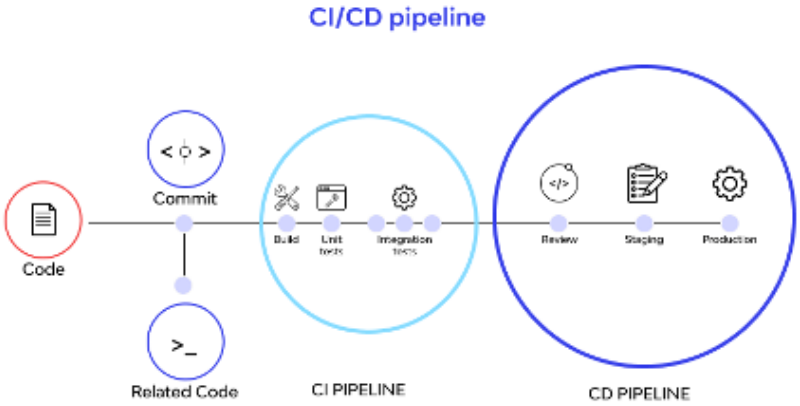
04 Composite Actions

05 Globus Compute

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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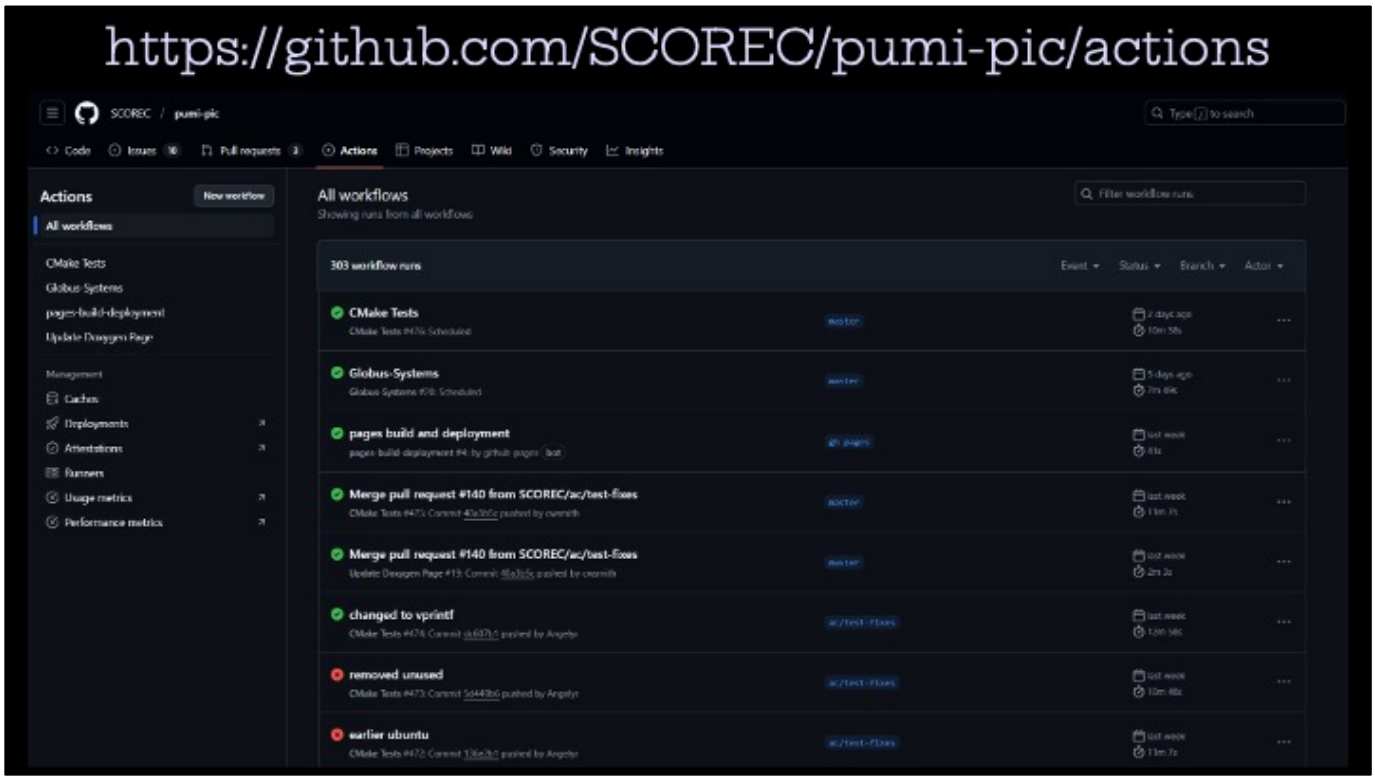


Github Repo
Actions Tab
All Workflows Tab

Left

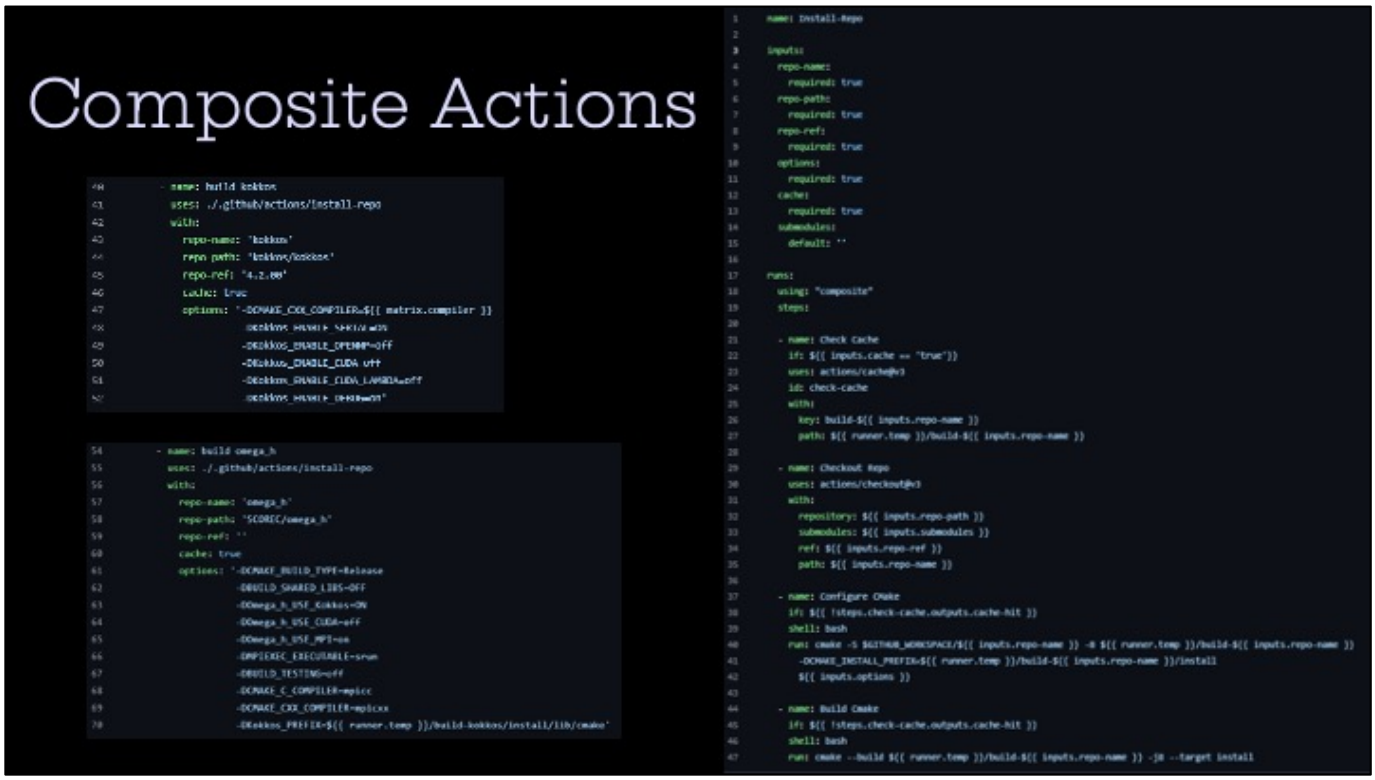
- **Workflows:** set of jobs to run
- **Caches:** archive to store data between workflow runs
- **Runners:** set of computers that your workflows

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



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

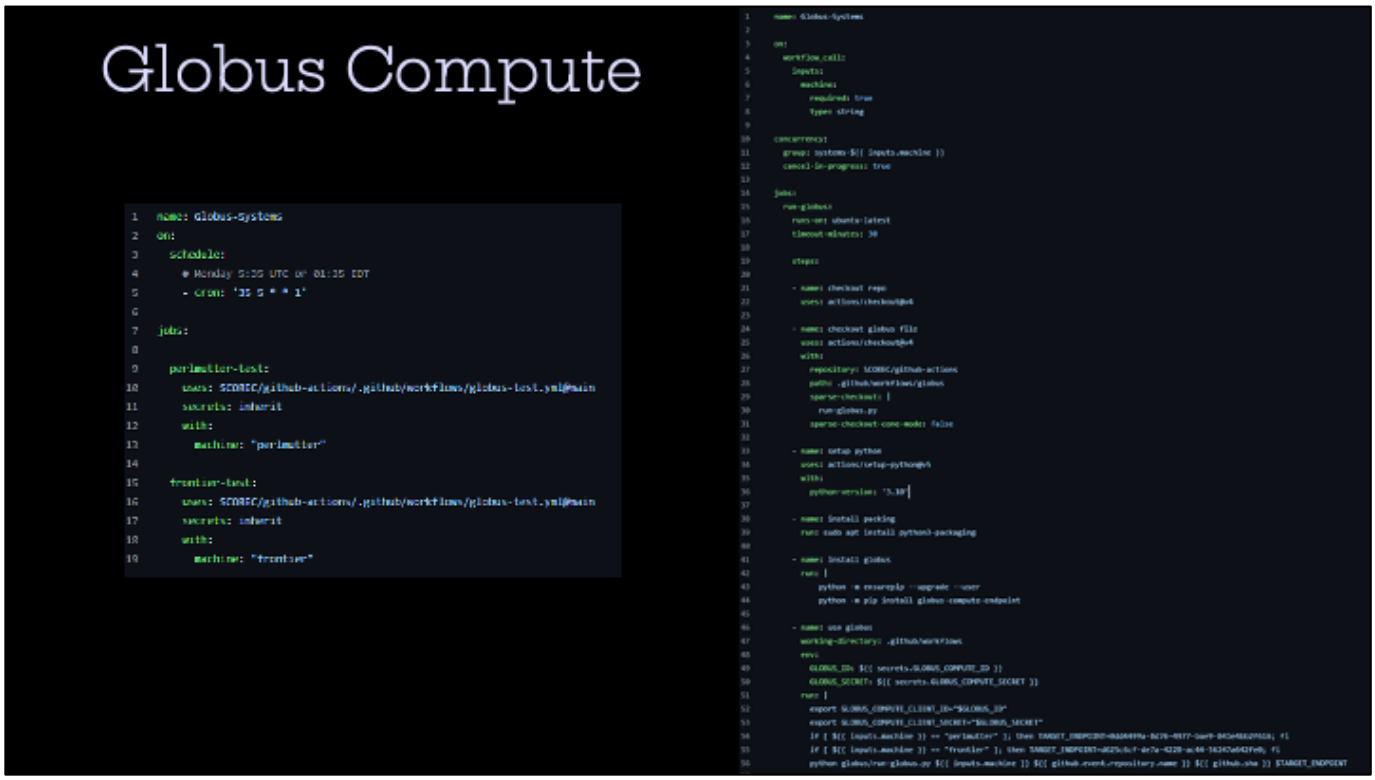
Advanced

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



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**:
    a. server on computer listening for information
    b. Validated by globus compute
    c. 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**:
    a. Reusable workflow
    b. Script with multiple steps that can be reused
    c. 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?