Exploring GitHub Actions Workflows

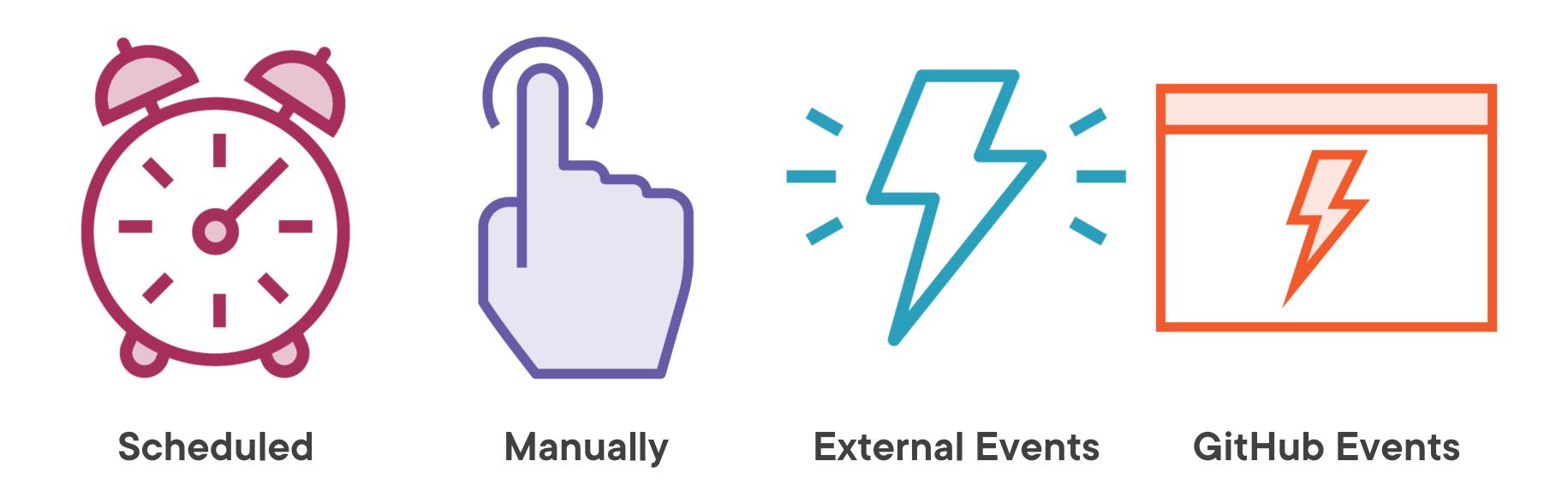


Neil Morrissey
Solutions Architect

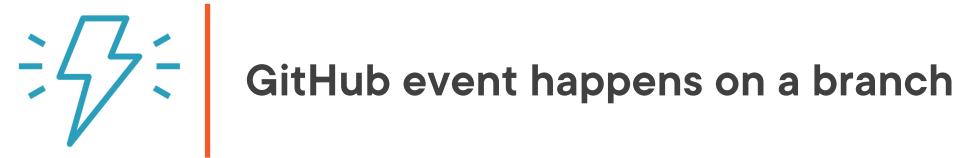
@morrisseycode www.neilmorrissey.net



Triggering Workflows



Triggering GitHub Events





.github/workflows directory on branch is searched for YAML files



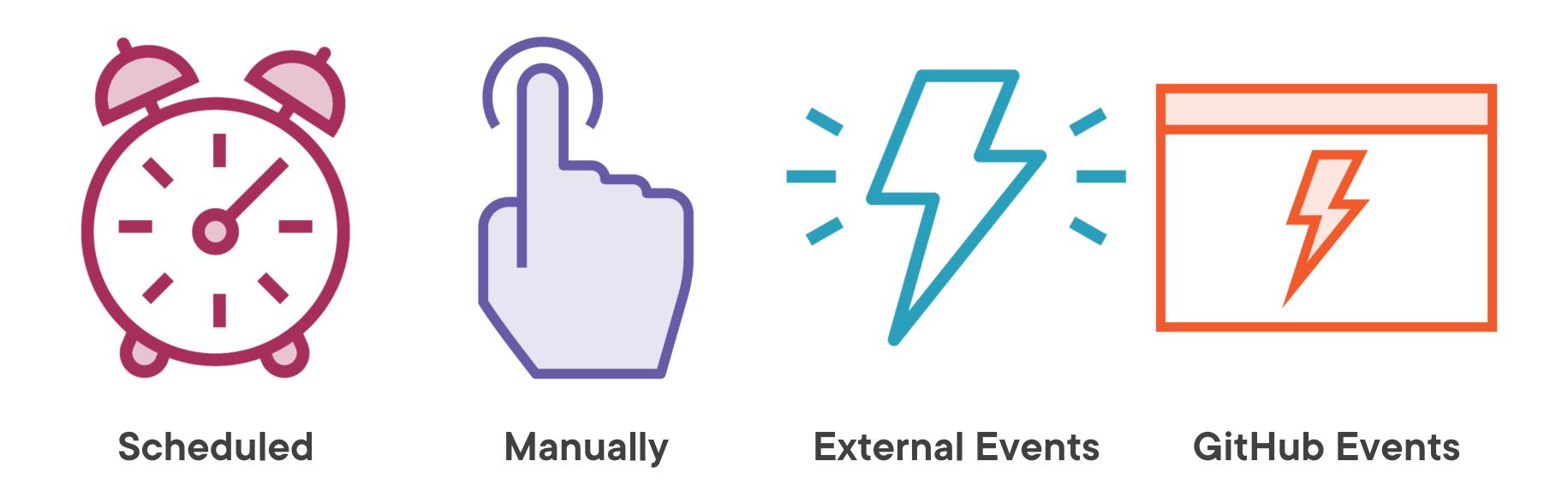
Workflow file(s) are inspected for matching trigger



If trigger events match, workflow is run

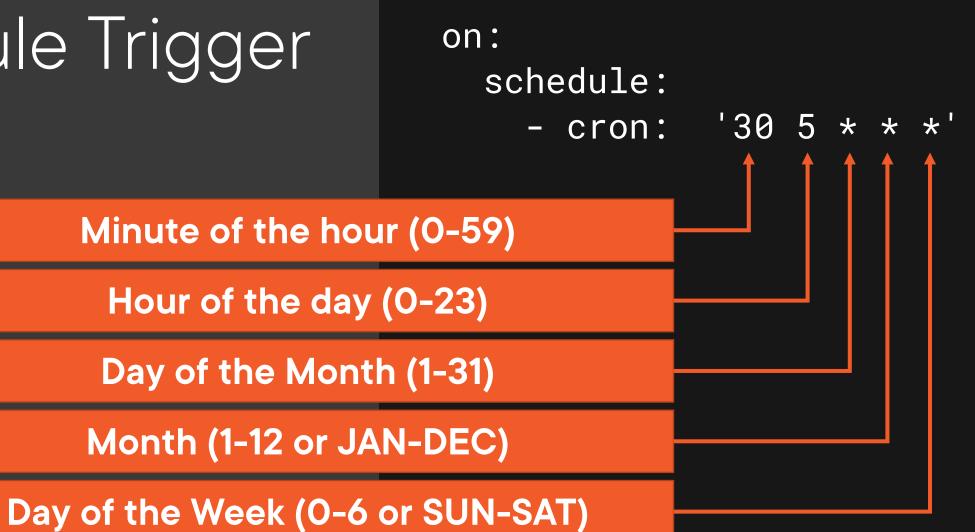


Triggering Workflows

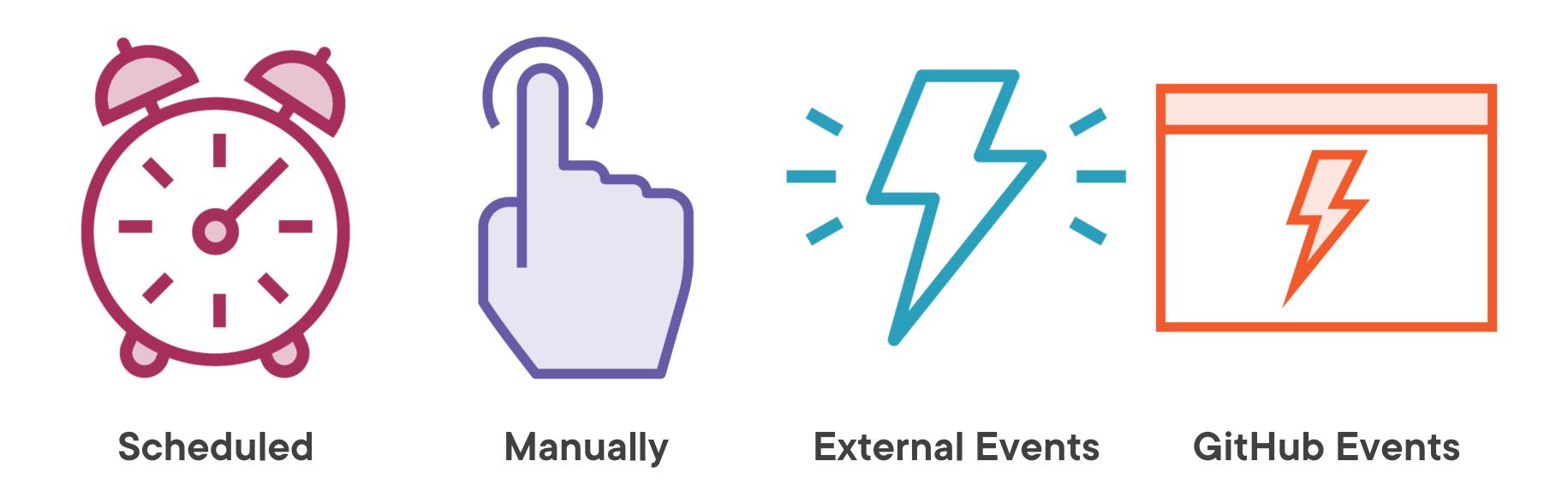


workflow.yaml

Schedule Trigger



Triggering Workflows



Triggering a Workflow from Outside GitHub

GitHub Workflow Dispatch Endpoint



https://api.github.com/repos/{owner}/{repo}/dispatches

https://api.github.com/repos/morrisseycode/myrepo/dispatches



Body of HTTP Request

JSON data

POST data

```
{
    "event_type": "my_event_type",
    "client_payload": {
        "somedata": "value passed to workflow"
    }
}
```

* client_payload is optional

Myworkflow.yaml

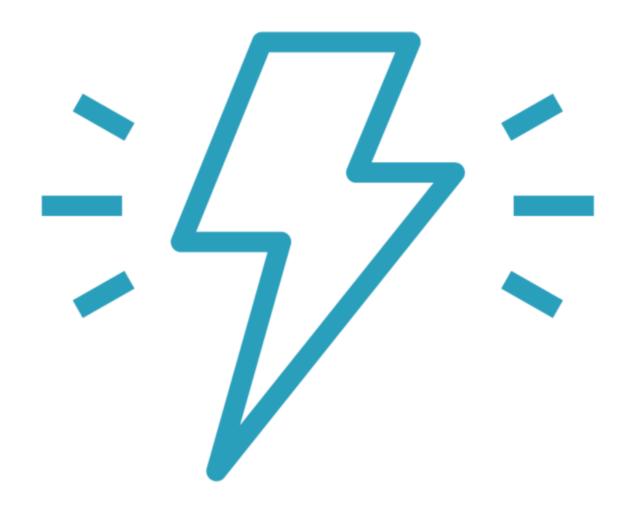
```
Name: My Workflow
On:
    repository_dispatch:
        types:
        my_event_type

Jobs:
    myJob:
    runs-on: ubuntu-latest
    run: echo 'From external process ${{ github.event.client_payload.somedata }}'
```

Myworkflow.yaml

```
Name: My Workflow
On:
    repository_dispatch:
        types:
            [my_event_type, another_event_type]

Jobs:
    myJob:
        runs-on: ubuntu-latest
        run: echo 'From external process ${{ github.event.client_payload.somedata }}'
```



Triggering workflows from outside GitHub

- Long running external process
- CMS triggers build when content changes
- Logging issues in GitHub from an external system
- Trigger workflow from external collaboration tools

GitHub REST endpoint expects JSON payload



Environment Variables and Contexts

Reading Context Values Using Expressions

```
- name: Setup .NET
    uses: actions/setup-dotnet@v1
    with:
    dotnet-version: '${{ env.DOT_NET_VERSION }}'
```

\${{ expressions }}

Literal values

Context values and Environment Variables

Functions



\${{ expressions }}

Can combine

- Literal values
- Context values
- Environment variables
- Functions

Operators

- ==
- !=
- &&
- 11
- > and <
- >= and <=

Evaluating expressions

```
- name: checkout code if running on master branch
    if: ${{ github.ref == 'refs/heads/main' }}
    uses: actions/checkout@v2
```

Using Scripts in a Workflow

```
- name: Print build config
  run: echo "Build Config - $BUILD_CONFIG"
- name: Build .NET Code
  run:
   dotnet restore
    dotnet build --configuration '${{ env.BUILD_CONFIG }}'
    dotnet publish -c Release -o '${{ env.AZURE_WEBAPP_PACKAGE_PATH }}/myapp'
- name: Run test script
  run: ./.github/scripts/test.sh
 shell: bash
```

steps:

- name: Display the path

run: echo \$PATH

shell: bash

Linux, Windows, MacOS

- bash
- pwsh (PowerShell Core)
- python

Windows only

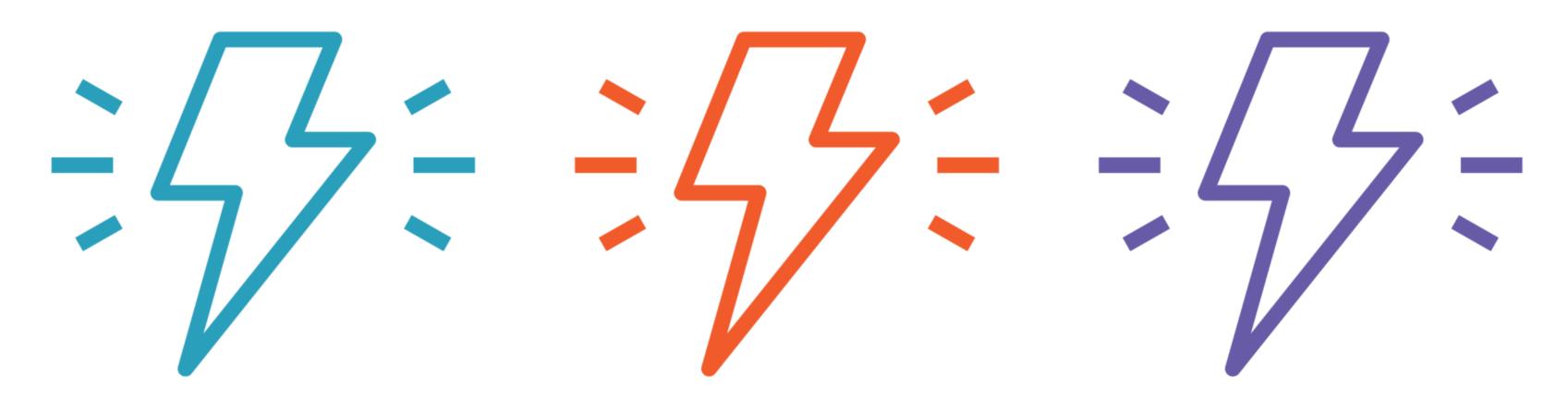
- cmd
- pwsh (PowerShell Core)
- powershell (PowerShell Desktop)

Linux / MacOS only

· sh

Inputs and Outputs of GitHub Actions

Types of GitHub Actions



JavaScript Actions

Run directly on runner Linux, Windows, or MacOS runner

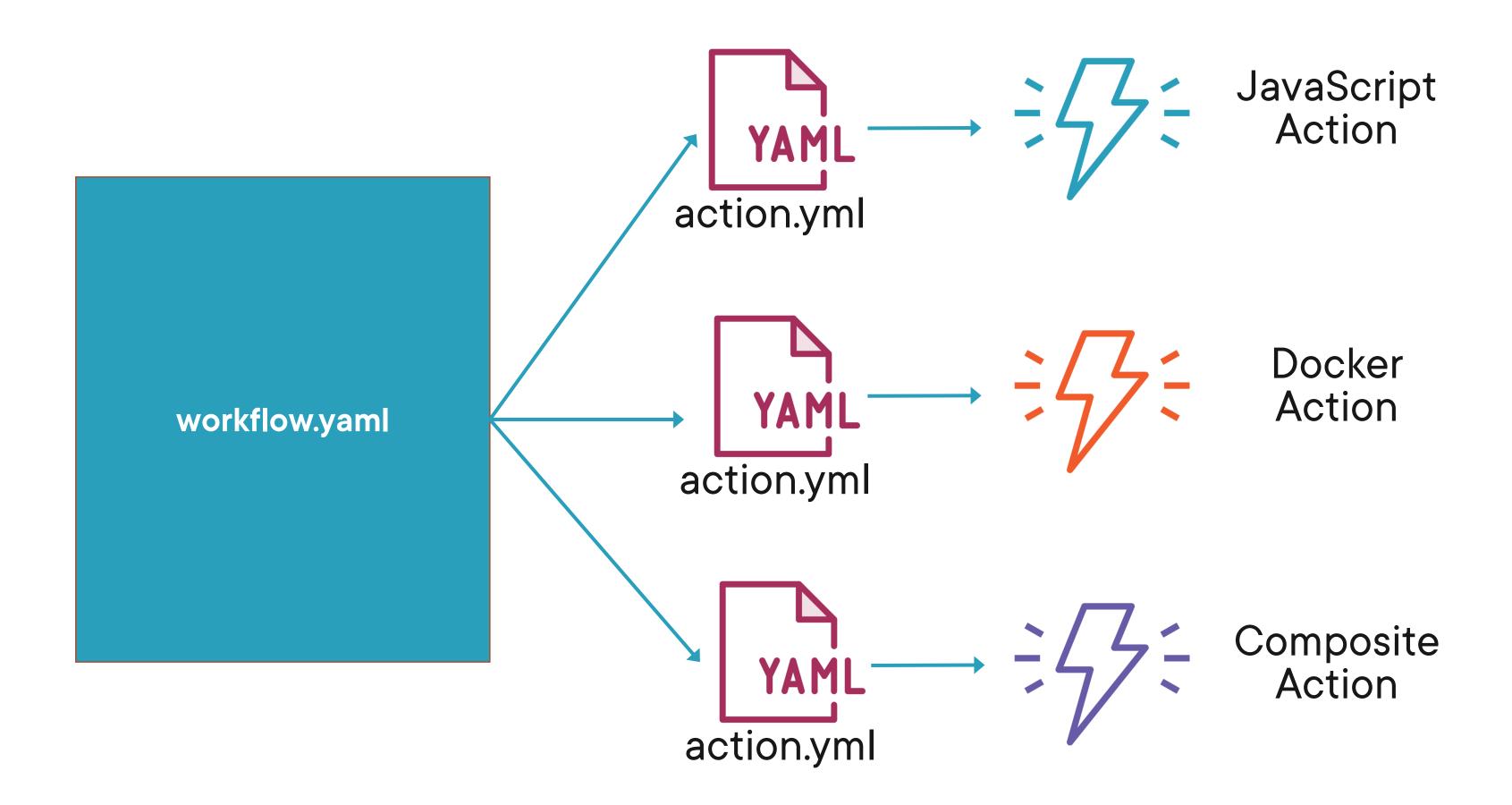
Docker Actions

Any programming language Linux runner only

Composite Actions

Combine multiple workflow steps
Reusability
Linux, Windows, or MacOS runner

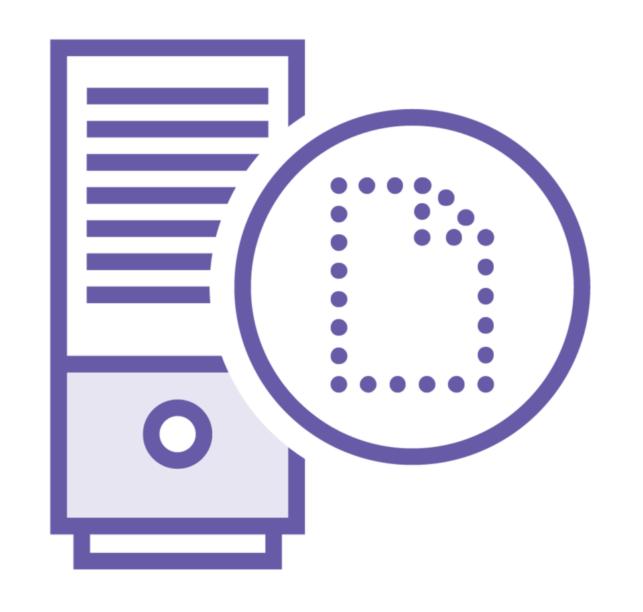




Caching for Performance



actions/cache



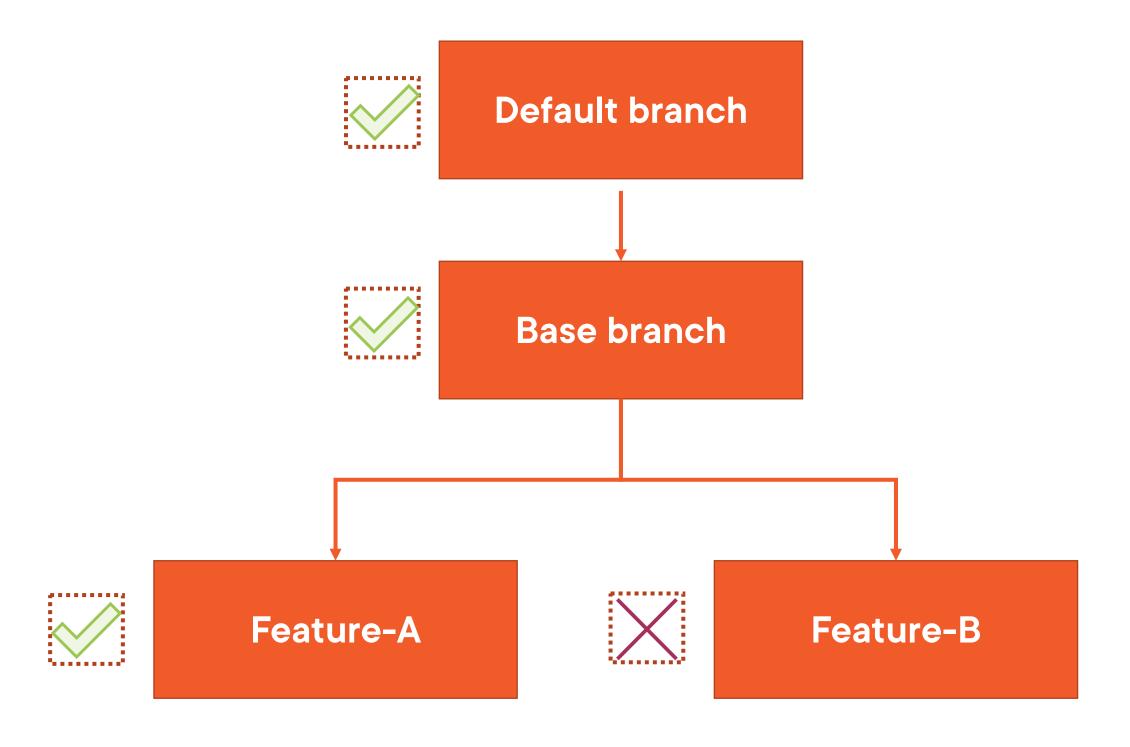
Can share data between workflow runs

Useful for caching dependencies

5GB cache limit per repository

Logical isolation

Cache isolation



- uses: actions/cache@v2

with:

path: ~/.nuget/packages

key: mycachednugetpackages

Basic cache action configuration

Unique cache entry for key name

```
- uses: actions/cache@v2
with:
   path: ~/.nuget/packages
   key: ${{ runner.os }}-nuget-${{ hashFiles('**/packages.lock.json') }}
```

Creating cache key using expressions

Caches new version each time hash value changes

```
- uses: actions/cache@v2
with:
   path: ~/.nuget/packages
   key: ${{ runner.os }}-nuget-${{ hashFiles('**/packages.lock.json') }}
   restore-keys: |
    ${{ runner.os }}-nuget-
```

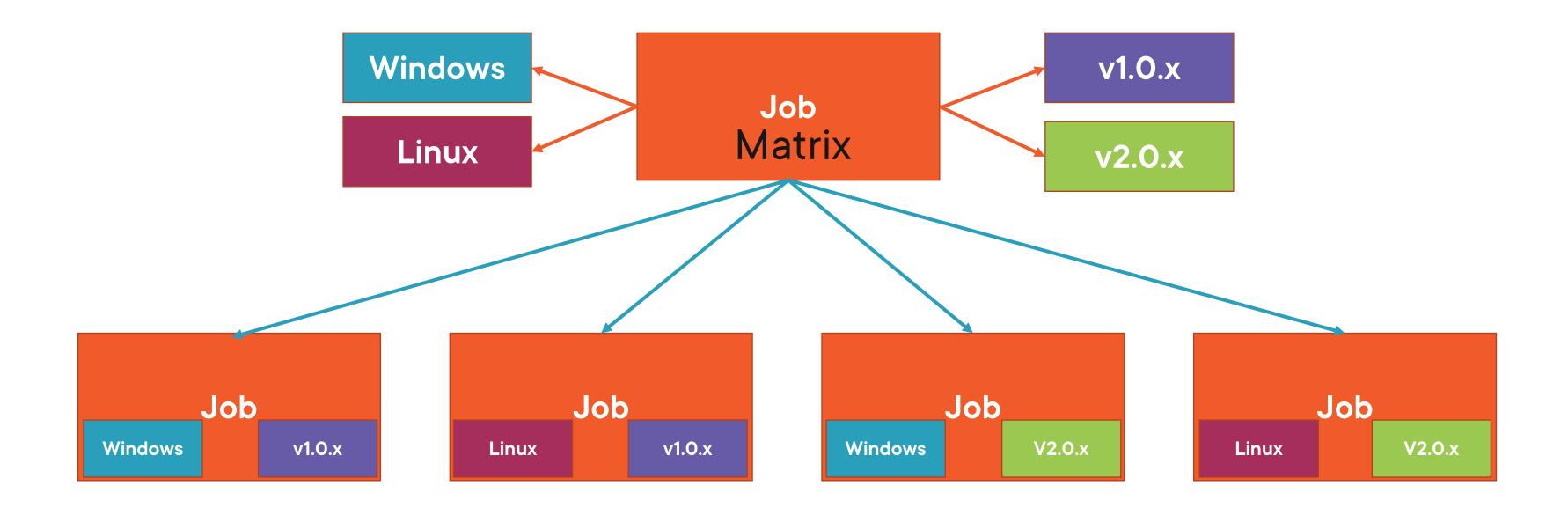
Restoring based on wildcard matches

When perfect match of key value isn't found

```
- uses: actions/cache@v2
with:
   path: ~/.nuget/packages
   !~/.nuget/packages/unwanted
   key: mycachednugetpackages
```

Excluding paths from caching

Configuring Multiple Jobs Using a Job Matrix



Summary



Workflow triggers

Workflow syntax

Scripts in workflows

GitHub Actions inputs and outputs

Job outputs, artifacts and caching

Job matrix

Additional logging configuration



Up Next:
Security for GitHub Actions

