GitHub Actions

For Enterprises - ESDE Workshop

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Structure

- What is GitHub?
- What are GitHub Actions?
- Terminology Introduction
- Workflow Basics
- Advanced Constructs
- Usage Examples
- Enterprise Features
- Are there Alternatives?
- Conclusion


What is
GitHub?

GitHub Actions

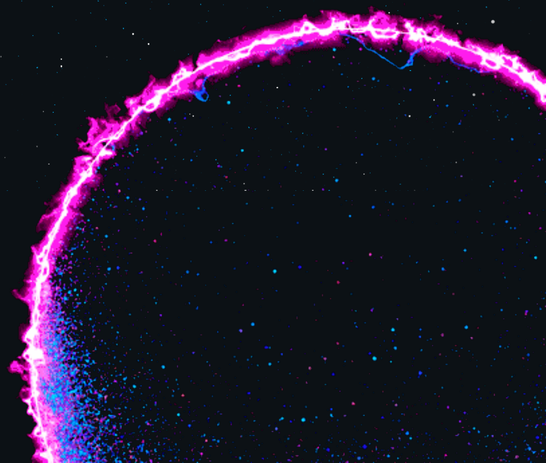
Mentimeter

menti.com

<put menti code here>

Source + Tooling : https://www.mentimeter.com/

What this workshop is NOT

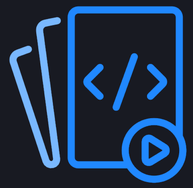


GitHub Actions

Core features

Linux, macOS, Windows, ARM, and containers

Matrix workflows that simultaneously test across multiple operating systems and versions of your runtime.



GitHub Actions supports Node.js, Python, Java, Ruby, PHP, Go, Rust, .NET, and more.

Source: https://github.com/features/actions

Terminology

Action

A program that becomes a reusable component to be used in workflows. Actions can install software for the environment, set up authentication, or automate complex sets of tasks. You can find actions in the GitHub Marketplace, or create your own and share them with your community.

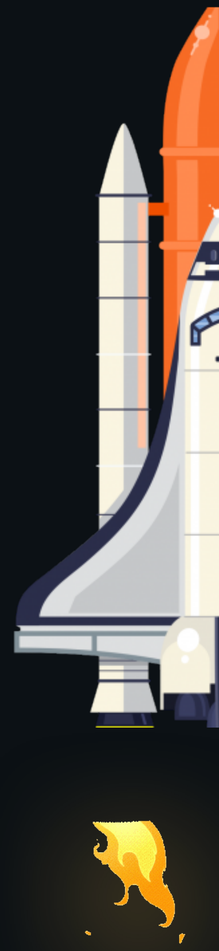
Source: https://assets.ctfassets.net/wfutmusr1t3h/0HWtwljwrnhdV3m50ZV87/5d0092144f32beeec76fb26ea17abfd8/_downloads_GitHub_Actions-Cheat-Sheet-One-Pager.pdf

Workflow

A configurable, automated process that you can use in your repository to build, test, package, release, or deploy your project. Workflows are made up of one or more "jobs" and can be triggered by GitHub events.

Source: https://assets.ctfassets.net/wfutmusr1t3h/0HWtwljwrnhdV3m50ZV87/5d0092144f32beeec76fb26ea17abfd8/_downloads_GitHub_Actions-Cheat-Sheet-One-Pager.pdf

Jobs



Source:https://www.pngfind.com/download/Tohowo_rocket-hd-png-download/

A list of the jobs that run as part of the workflow. Each job will run independently of the others, and will run on a different virtual environment. Jobs may have a name to make them easily identifiable in the UI. Jobs contain a set of steps that will be executed, in order.

Source: https://resources.github.com/whitepapers/github-actions-cheat/

YAML

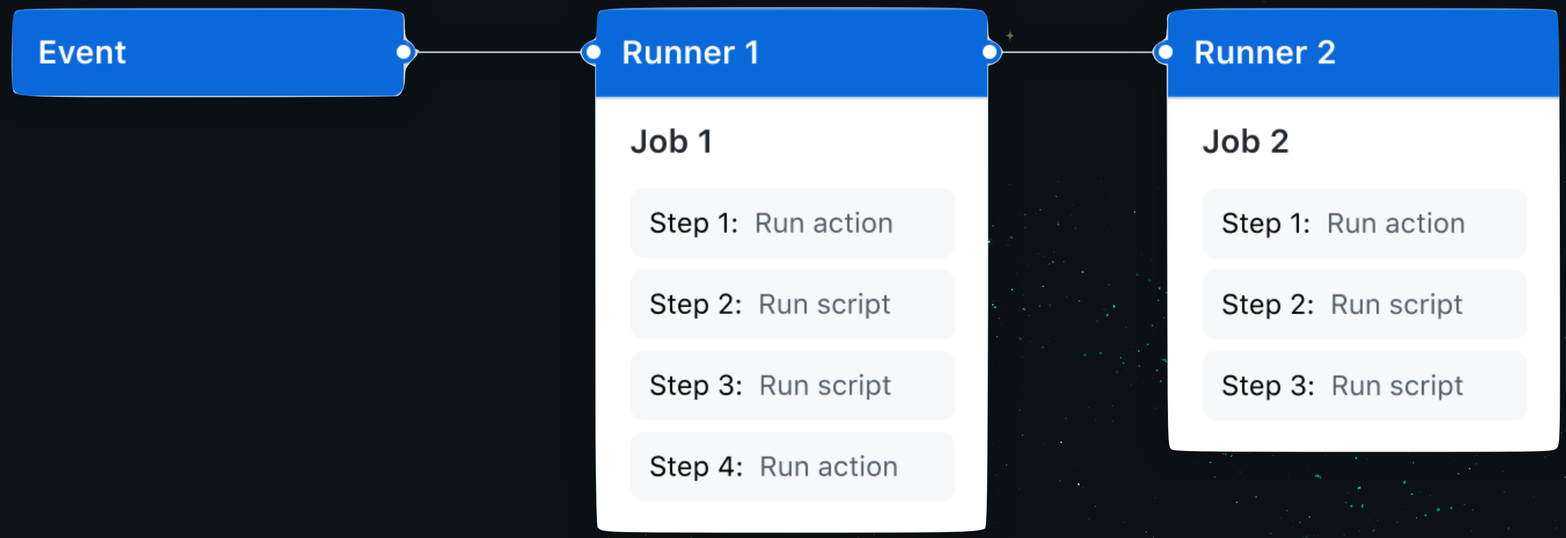
Source: https://dribbble.com/shots/5893676-Planet

YAML stands for "Yet Another Markup Language". It's a human-readable markup language commonly used for configuration files, especially by CI- and DevOps-focused software tools. GitHub Actions uses YAML as the basis of its configuration workflows.

Sources: https://resources.github.com/whitepapers/github-actions-cheat/
https://dribbble.com/shots/5893676-Planet

Workflow basics

Visual representation of the structure

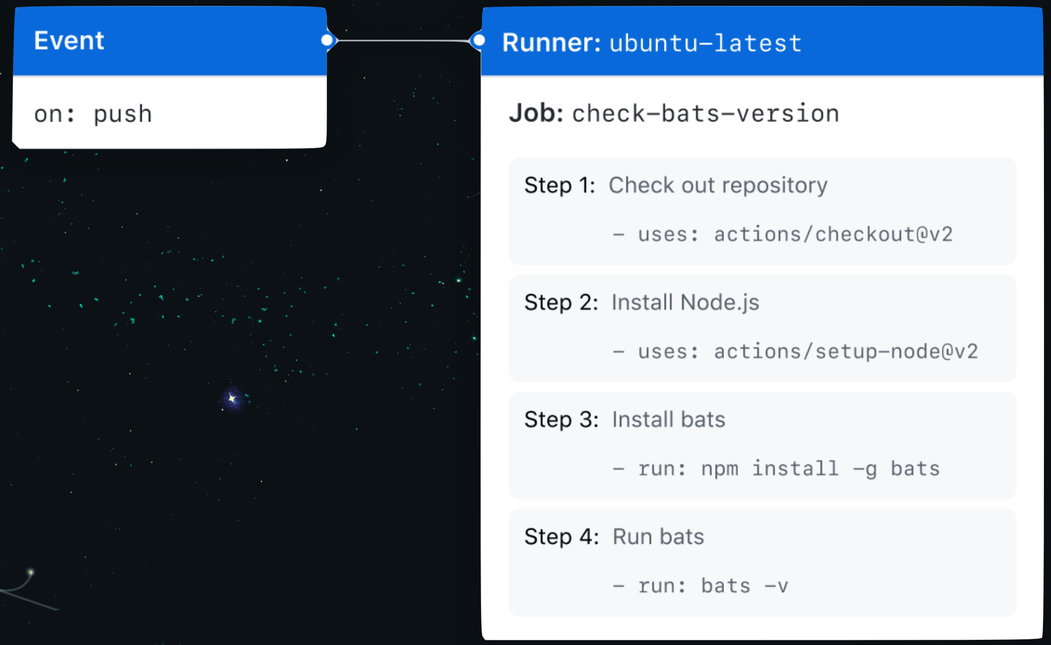


Source: https://docs.github.com/en/actions/using-workflows/about-workflows

Workflow basics

Now the code

```yaml
name: learn-github-actions
run-name: ${{ github.actor }} is learning GitHub Actions
on: [push]
jobs:
  check-bats-version:
    runs-on: ubuntu-latest
    steps:
      - uses: actions/checkout@v3
      - uses: actions/setup-node@v3
        with:
          node-version: '14'
      - run: npm install -g bats
      - run: bats -v
```



Source: https://docs.github.com/en/actions/using-workflows/about-workflows#create-an-example-workflow

Interactive - Hello World

Source: https://docs.github.com/en/actions/using-workflows/about-workflows#create-an-example-workflow

Reusing workflows

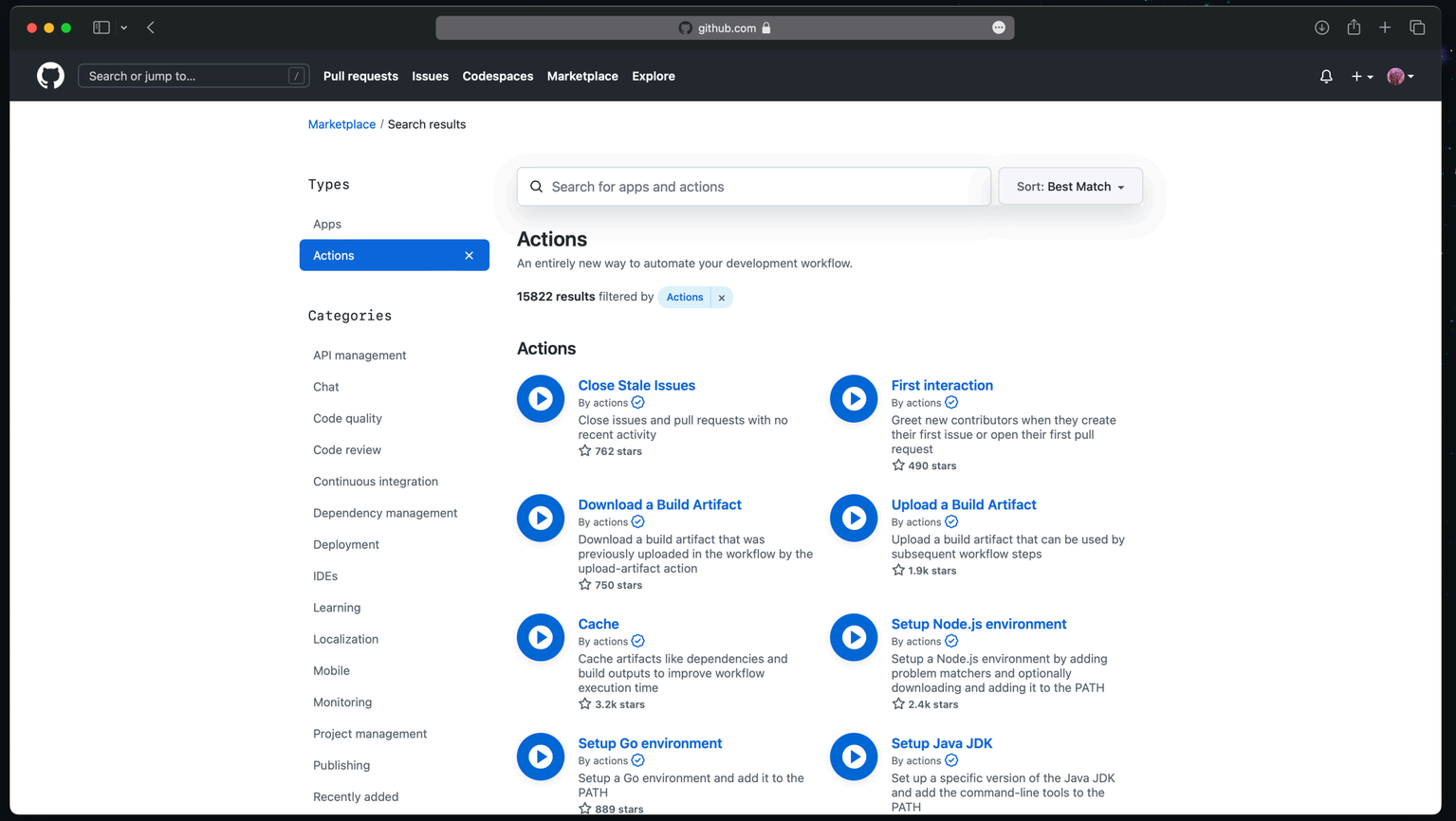
Don't repeat yourself

```yaml
name: Reusable workflow example

on:
  workflow_call:
    inputs:
      config-path:
        required: true
        type: string
    secrets:
      token:
        required: true

jobs:
  triage:
    runs-on: ubuntu-latest
    steps:
    - uses: actions/labeler@v4
      with:
        repo-token: ${{ secrets.token }}
        configuration-path: ${{ inputs.config-path }}}
```

Source: https://docs.github.com/en/actions/using-workflows/reusing-workflows

GitHub Marketplace

Community Actions



Source: https://github.com/marketplace?category=&query=&type=actions

Inter Job Dependencies

Needs successful completion

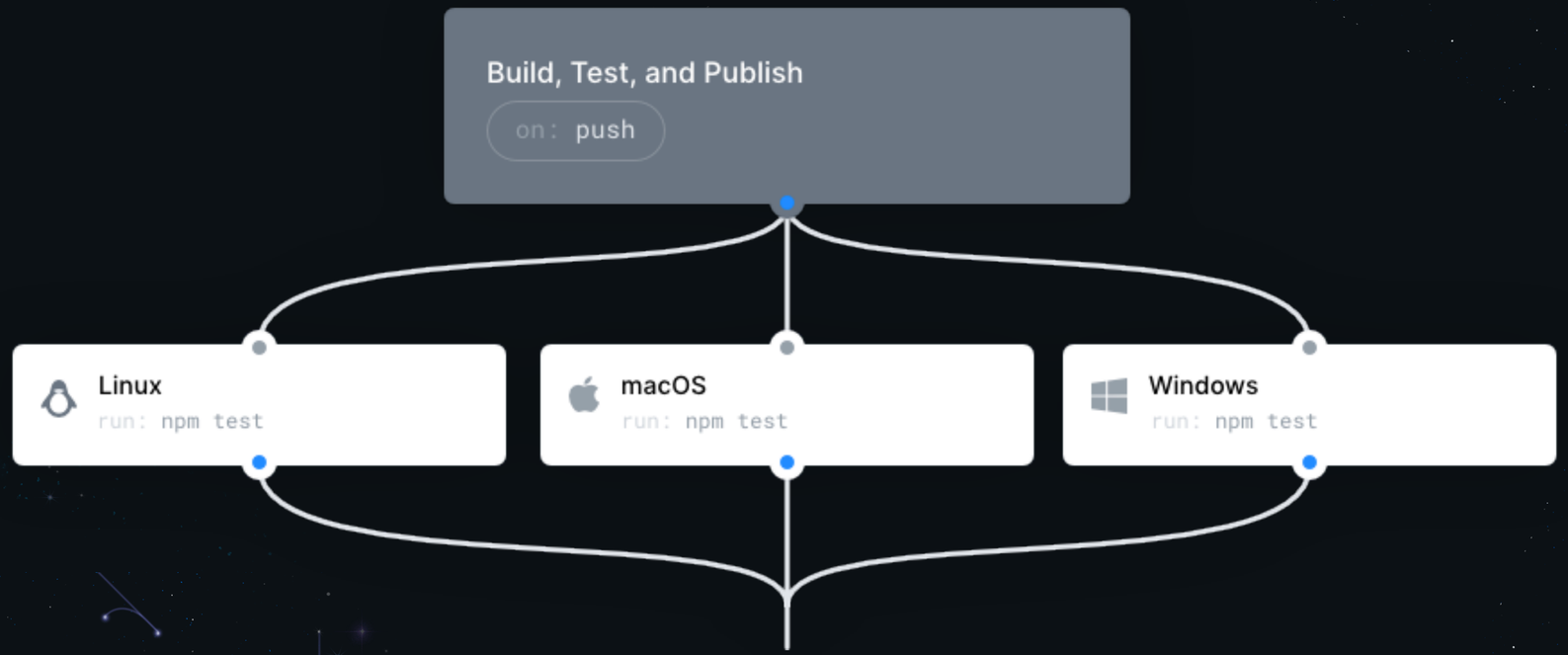
```yaml
jobs:
  job1:
  job2:
    needs: job1
  job3:
    needs: [job1, job2]
```

1. job1
2. job2
3. job3

Source: https://docs.github.com/en/actions/using-jobs/using-jobs-in-a-workflow#defining-prerequisite-jobs

Matrix Strategies

Multi Platform Actions

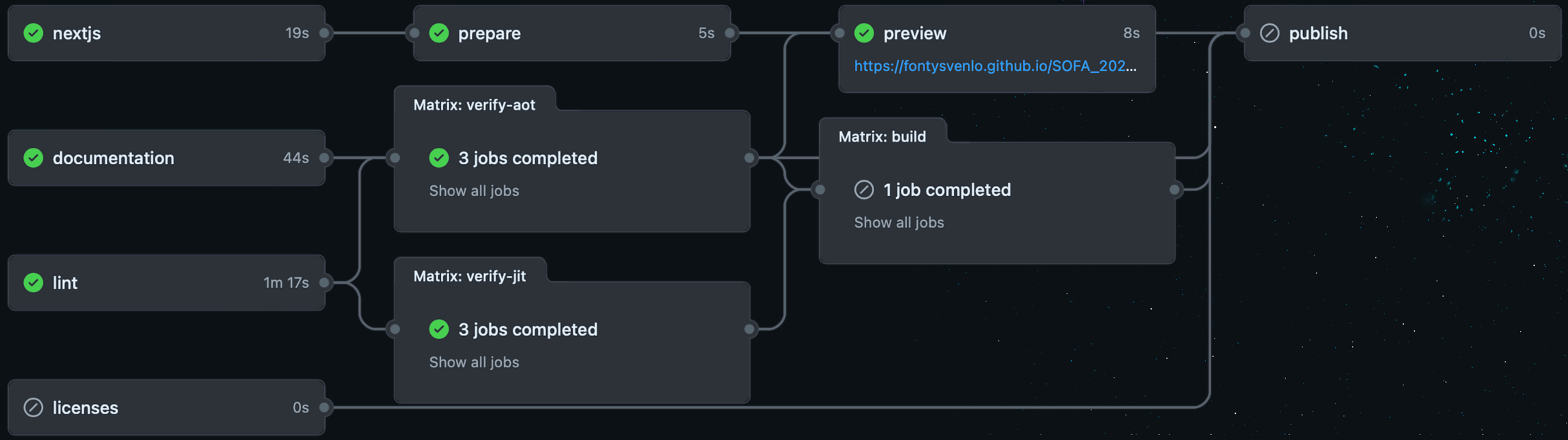


Source: https://github.com/features/actions

Are there any other features?

Robotica - SoFa

Composable pipeline



Source: https://github.com/FontysVenlo/SOFA_2022_Robotica_Inther

FOSS Plant Insights - PIOT

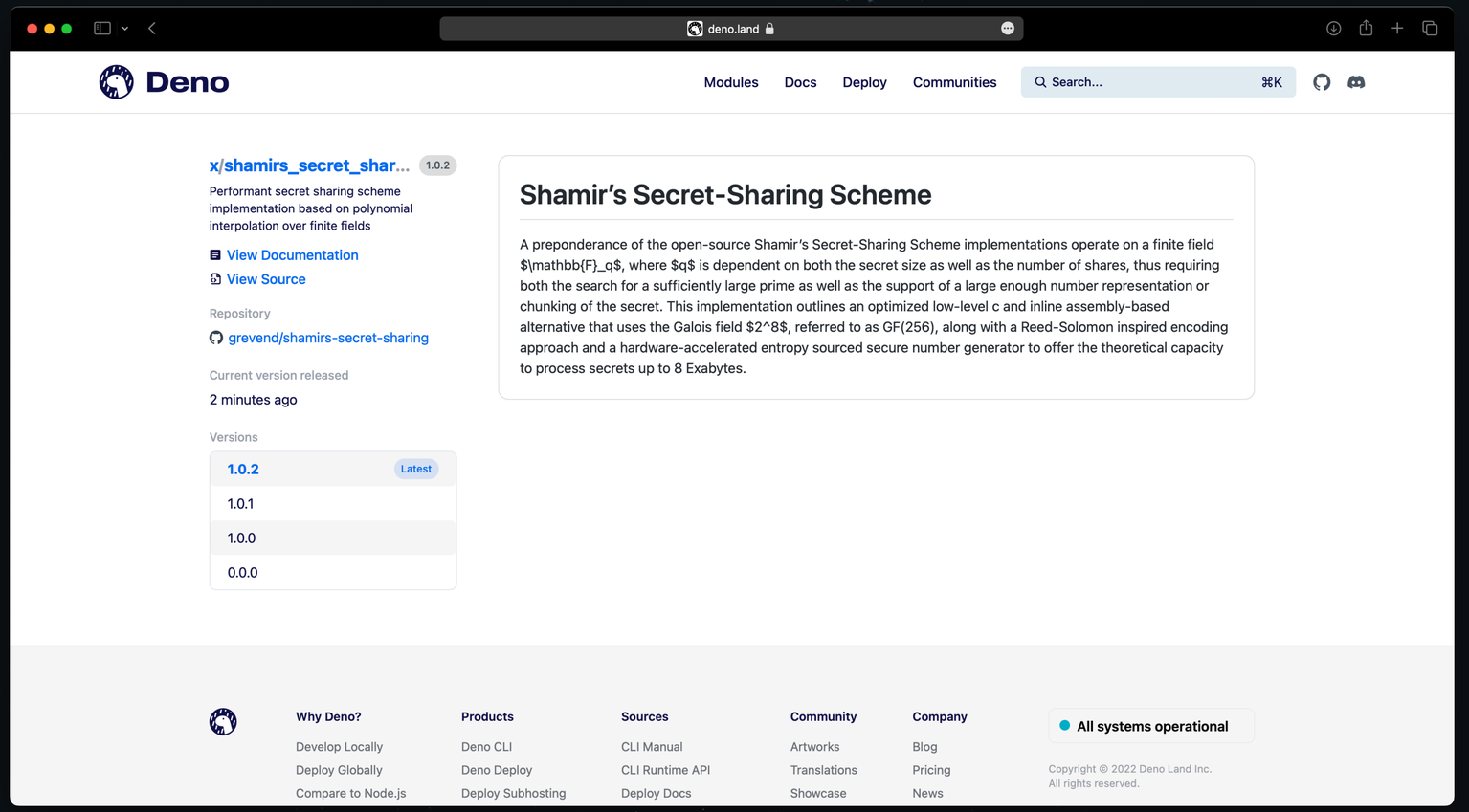
Open Source Intelligence using Flat Data


```
{
  "roomTemp": 21.4,
  "roomHumidity": 89,
  "timestamp": 1668342997,
  "light": {
    "visible": 15.333333333333334,
    "ultraviolet": 0.1,
    "infrared": 48,
    "isOn": true
  },
  "hasWater": false,
  "isWatering": false,
  "plants": [
    {
      "name": "Peper Anaheim",
      "soilTemp": 85,
      "soilMoisture": 1732
    },
    {
      "name": "Peper Anaheim",
      "soilTemp": 20.625,
      "soilMoisture": 1655
    }
  ]
}
```


Source: https://github.com/grevend/fontys-piot-flatdata-test

Shamir’s Secret Sharing Scheme

High performance impl. with hw. accelerated number generation



Source: https://deno.land/x/shamirs_secret_sharing@1.0.2

Interactive - Fix Repository

Source: https://docs.github.com/en/actions/using-workflows/about-workflows#create-an-example-workflow

Kahoot!

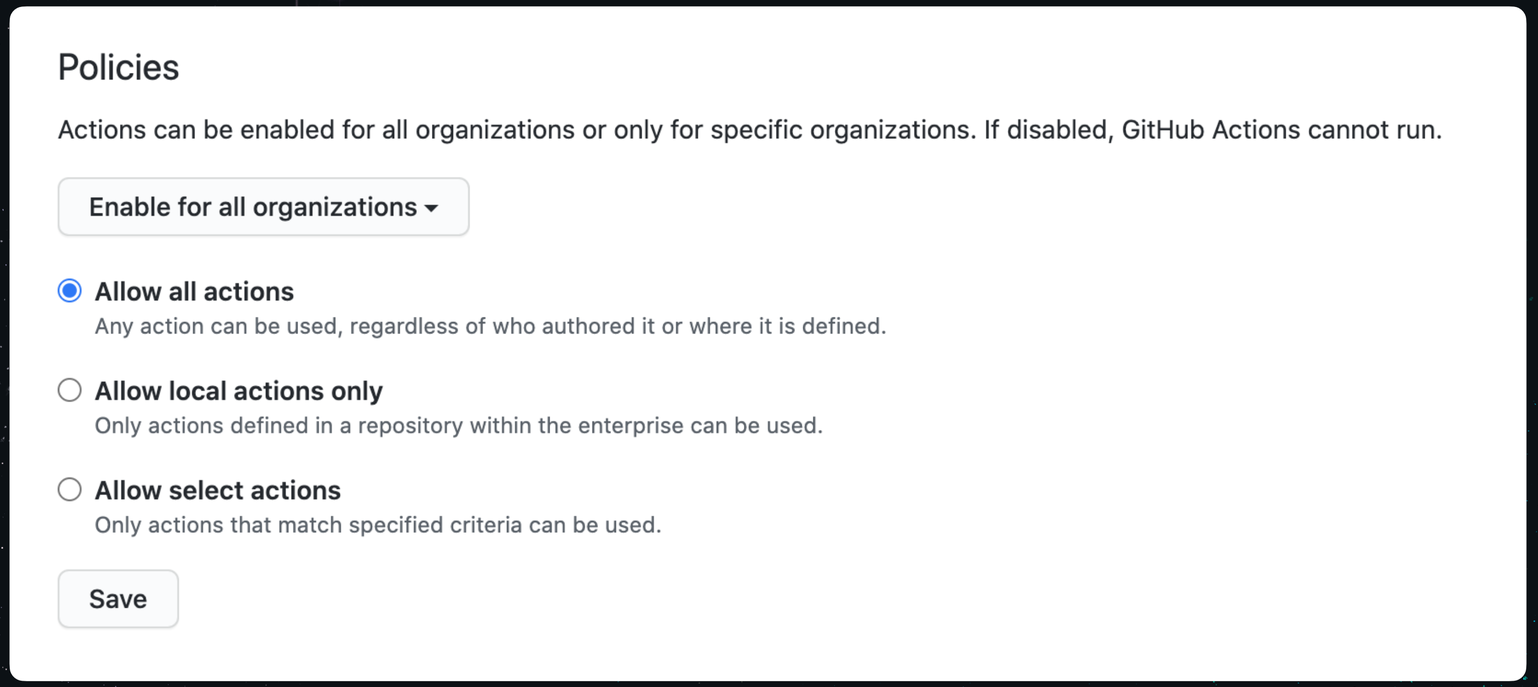
kahoot.it

<put kahoot code here>

Source + Tooling : https://kahoot.com/

Governance & Compliance

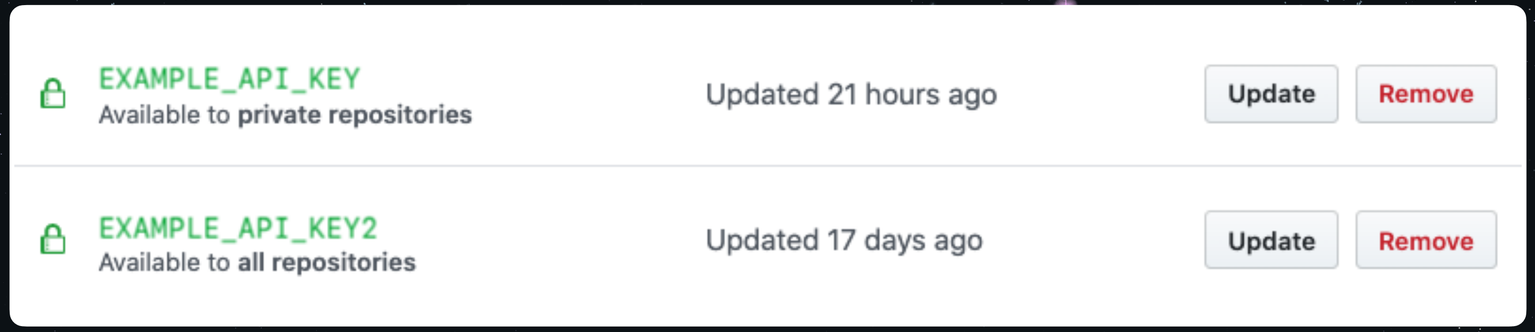
Policy governed capabilities



Source: https://docs.github.com/en/enterprise-server@3.3/admin/github-actions/getting-started-with-github-actions-for-your-enterprise/introducing-github-actions-to-your-enterprise#governance-and-compliance

Secrets & Deployment Resources

Security hardening workflows



Source: https://docs.github.com/en/enterprise-server@3.3/admin/github-actions/getting-started-with-github-actions-for-your-enterprise/introducing-github-actions-to-your-enterprise#security

Permissions

GITHUB_TOKEN

```yaml
permissions:
  actions: read|write|none
  checks: read|write|none
  contents: read|write|none
  deployments: read|write|none
  id-token: read|write|none
  issues: read|write|none
  discussions: read|write|none
  packages: read|write|none
  pages: read|write|none
  pull-requests: read|write|none
  repository-projects: read|write|none
  security-events: read|write|none
  statuses: read|write|none
```

Source: https://docs.github.com/en/enterprise-server@3.3/admin/github-actions/getting-started-with-github-actions-for-your-enterprise/introducing-github-actions-to-your-enterprise#security

Secret Scanning

Partner patterns

Partner	Supported secret
Adafruit IO	Adafruit IO Key
Adobe	Adobe Device Token
Adobe	Adobe Service Token
Adobe	Adobe Short-Lived Access Token
Adobe	Adobe JSON Web Token
Alibaba Cloud	Alibaba Cloud Access Key ID and Access Key Secret pair
Amazon Web Services (AWS)	Amazon AWS Access Key ID and Secret Access Key pair
Atlassian	Atlassian API Token
Atlassian	Atlassian JSON Web Token

Source: https://docs.github.com/en/enterprise-cloud@latest/code-security/secret-scanning/secret-scanning-patterns#supported-secrets-for-advanced-security

- Managed service offering
- Granular policies
- Usage tracking
- Log forwarding
- Secret scanning
- Autoscaling runners

- Containerized builds
- Environments
- Marketplace
- Permissions
- Innersourcing
- Vulnerability detection

Source: https://docs.github.com/en

- ○ Managed service offering
- ○ Granular policies
- ○ Usage tracking
- ✓ Log forwarding
- ○ Secret scanning
- ○ Autoscaling runners

- Containerized builds ✓
- Environments ✓
- Marketplace ✓
- Permissions ○
- Innersourcing ✓
- Vulnerability detection ✓

Source: https://docs.github.com/en/actions/migrating-to-github-actions/migrating-from-jenkins-to-github-actions

- [x] Managed service offering
- [ ] Granular policies
- [x] Usage tracking
- [ ] Log forwarding
- [ ] Secret scanning
- [x] Autoscaling runners

- [x] Containerized builds
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- [x] Innersourcing
- [ ] Vulnerability detection

Source: https://docs.github.com/en/actions/migrating-to-github-actions/migrating-from-circleci-to-github-actions

Conclusion


Questions?


Feedback