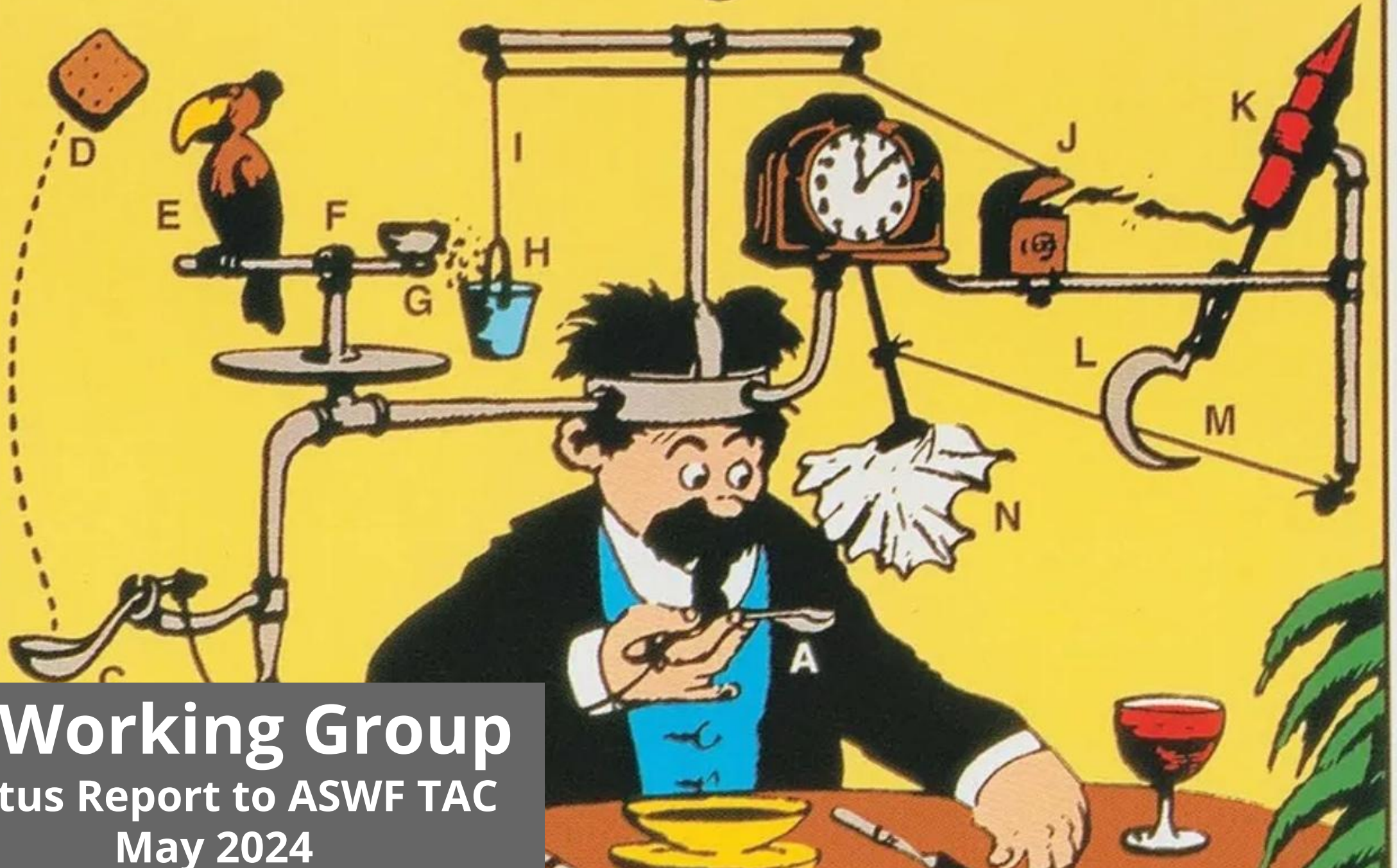


Rube Goldberg's Inventions



CI Working Group
Status Report to ASWF TAC
May 2024

Continuous Integration WG Mission Statement

The ASWF Continuous Integration (CI) Working Group is tasked to investigate and deliver tools, procedures and services used by ASWF projects in their development process, including:

- Revision control
- Build toolchains
- CI build environments
- Testing
- Packaging and distribution

Continuous Integration WG Mission Statement (cont)

- Provide a forum for the exchange of ideas between individuals interested in all aspects of the tooling and processes involved in software development, building and distribution
- Nothing we do is prescriptive, projects are free to adopt or not, and are encouraged to share infrastructure with other ASWF projects.

Our Meetings

- One meeting a month, off cadence from TAC (next is June 19th at 13:00 Pacific Time)
- On average 6-7 attendees over last 12 months, core group of frequent attendees
- A good place to interact with LF Release Engineering
- Jan 2024 had guests from GitHub Actions team discussing upcoming features
 - Hoping to make that a recurring event
- Meeting minutes in wg-ci repo:
<https://github.com/AcademySoftwareFoundation/wg-ci/tree/main/meetings>

Slack: #wg-ci

- Slack Channel: #wg-ci 330 members (up from 240 last year)
 - reasonable traffic volume, enough to help fill meeting agenda, a good place to share an interest in tooling



Where to Get Help with Infrastructure

- #wg-ci for general discussion
- Linux Foundation Release Engineering Helpdesk:
<https://jira.linuxfoundation.org/plugins/servlet/desk>
 - GitHub Permissions
 - Secrets Management
 - External Integrations
- Drop by our monthly call!

Status Update

Parts of our service are experiencing issues. [View StatusPage](#)

Project Support Services > Request PyPI organization on behalf of AcademySoftwareFoundation

 Request PyPI organization on behalf of AcademySoftwareFoundation (IT-24425)

Comment on this request...

ACTIVITY

Your request status changed to: **Waiting for Customer** 25/Apr/23 7:56 AM **LATEST**



Andrew Grimberg 25/Apr/23 7:56 AM

I applied for the "alias" of aswf with the long description of "Academy Software Foundation" which is what the registration form seemed to be indicating to me was the best way given the examples in the form.

Your request status changed to: **Waiting for Support** 24/Apr/23 2:12 PM



Jean-Francois Panisset 24/Apr/23 2:12 PM

Did you apply for "AcademySoftwareFoundation" or "aswf"?

CI WG Wiki

<https://wiki.aswf.io/display/CIWG>

/* ACADEMY
SOFTWARE
FOUNDATION

← → ↺ wiki.aswf.io/display/CIWG

Confluence Spaces ▾



Continuous Integration (CI)
Working Group

Pages

Blog

PAGE TREE

Pages

Continuous Integration (CI) Working Group Home

Created by [John Mertic](#), last modified by [Jean-Francois Panisset](#) on [Mar 12, 2024](#)

CI Working Group	
Slack channel	#wg-ci
Meeting Information	Working Group meets every 4 weeks on Wednesday from 13:00 to 14:00 Pacific Time. ASWF Calendar Video Conference Link
TAC Member Sponsor	Jean-Francois Panisset
Chairperson(s)	Jean-Francois Panisset

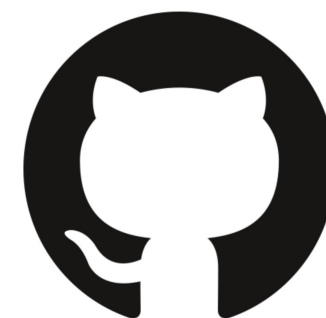
Purpose

The ASWF Continuous Integration (CI) Working Group is tasked to investigate and deliver tools, procedures and services used by ASWF projects in their development process, including:

- Revision control
- Build toolchains
- CI build environments
- Testing
- Packaging and distribution

GitHub Free Runners

- Free runners adequate for many jobs
 - Recently upgraded: 4 core, 16GB RAM (was 2 cores, 7GB)
 - But still only 14GB disk, can be challenging
- Apple Silicon runners finally available (Jan 2024)
- No Windows/Linux on ARM yet



Virtual Machine	Processor (CPU)	Memory (RAM)	Storage (SSD)	OS (YAML workflow label)	Notes
Linux	4	16 GB	14 GB	ubuntu-latest , ubuntu-24.04 [Beta], ubuntu-22.04 , ubuntu-20.04	The ubuntu-latest label currently uses the Ubuntu 22.04 runner image.
Windows	4	16 GB	14 GB	windows-latest , windows-2022 , windows-2019	The windows-latest label currently uses the Windows 2022 runner image.
macOS	3	14 GB	14 GB	macos-12 or macos-11	The macos-11 label has been deprecated and will no longer be available after 6/28/2024.
macOS	4	14 GB	14 GB	macos-13	N/A
macOS	3 (M1)	7 GB	14 GB	macos-latest or macos-14	The macos-latest label currently uses the macOS 14 runner image.

ASWF Enterprise GitHub Organization

- Higher limits on free GHA minutes, concurrent jobs
- Access to larger, for pay runners:
 - \$1,500/month pre-authorized
 - Used by OpenVDB, aswf-docker for builds that wouldn't complete otherwise
 - Informally managed
 - Available to all projects, but to be used judiciously
- LF RelEng working on extending Enterprise org benefits to projects not under ASWF GitHub org

Access to Larger Runners

/* ACADEMY
SOFTWARE
FOUNDATION

The screenshot shows the GitHub interface for the repository `AcademySoftwareFoundation / wg-ci`. The **Actions** tab is selected in the top navigation bar. In the left sidebar, the **Runners** link is highlighted. The main content area shows the **Runners** section with tabs for **GitHub-hosted runners** and **Self-hosted runners**. The **Self-hosted runners** tab is active, displaying a list of 7 available runners. Each runner entry includes a name, a link to the `Organization` page, and a label with the runner's name. The runners are categorized into **Standard GitHub-hosted runners** and **Self-hosted runners**.

Runners available to this repository

7 available runners

Standard GitHub-hosted runners
Ready-to-use runners managed by GitHub. [Learn more about GitHub-hosted runners.](#)

Runner Name	Organization	Label
ubuntu-20.04-16c-64g-600h	Organization	ubuntu-20.04-16c-64g-600h
ubuntu-20.04-16c-64g-600h		ubuntu-20.04-16c-64g-600h
ubuntu-20.04-16c-64g-600h		ubuntu-20.04-16c-64g-600h
windows-2022-16c-64g-600h	Organization	windows-2022-16c-64g-600h
windows-2022-16c-64g-600h		windows-2022-16c-64g-600h
windows-2022-16c-64g-600h		windows-2022-16c-64g-600h
ubuntu-20.04-8c-32g-300h	Organization	ubuntu-20.04-8c-32g-300h
ubuntu-20.04-8c-32g-300h		ubuntu-20.04-8c-32g-300h
ubuntu-20.04-8c-32g-300h		ubuntu-20.04-8c-32g-300h
windows-2022-8c-32g-300h	Organization	windows-2022-8c-32g-300h
windows-2022-8c-32g-300h		windows-2022-8c-32g-300h
windows-2022-8c-32g-300h		windows-2022-8c-32g-300h
ubuntu-20.04-gpu-t4-4c-16g-176h	Organization	ubuntu-20.04-gpu-t4-4c-16g-176h
ubuntu-20.04-gpu-t4-4c-16g-176h		ubuntu-20.04-gpu-t4-4c-16g-176h
ubuntu-20.04-gpu-t4-4c-16g-176h		ubuntu-20.04-gpu-t4-4c-16g-176h
windows-ds-2019-gpu-t4-4c-16g-176h	Organization	windows-ds-2019-gpu-t4-4c-16g-176h
windows-ds-2019-gpu-t4-4c-16g-176h		windows-ds-2019-gpu-t4-4c-16g-176h
windows-ds-2019-gpu-t4-4c-16g-176h		windows-ds-2019-gpu-t4-4c-16g-176h

Access to Larger Runners OpenVDB Weekly Workflow

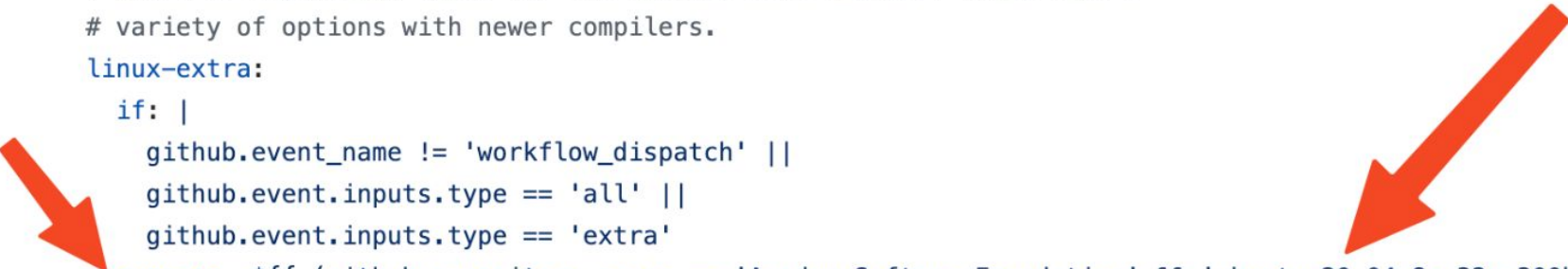
/* ACADEMY
SOFTWARE
FOUNDATION

← → ↺ 🔍 github.com/AcademySoftwareFoundation/openvdb/blob/master/.github/workflows/weekly.yml

📁 master 🔽 openvdb / .github / workflows / weekly.yml

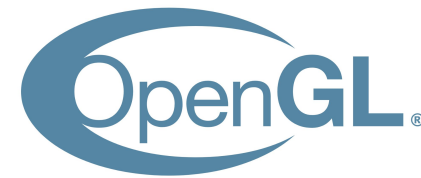
Code Blame 486 lines (467 loc) · 21.4 KB · ⓘ

```
137 #####
138 ##### Core Library Extras #####
139 #####
140
141 # Extra configuration tests for the OpenVDB Core library. These test a
142 # variety of options with newer compilers.
143 linux-extra:
144   if: |
145     github.event_name != 'workflow_dispatch' ||
146     github.event.inputs.type == 'all' ||
147     github.event.inputs.type == 'extra'
148   runs-on: ${ (github.repository_owner == 'AcademySoftwareFoundation' && 'ubuntu-20.04-8c-32g-300h') || 'ubuntu-latest' }
149   name: linux-extra:${{ matrix.config.name }}
150   container:
151     # @note we specifically use clang15.0 (not clang15) here as the newest
152     # versions of the clang15.X containers have some issues with the GLFW
153     # installation
154     image: aswf/ci-openvdb:2023-clang15.0
155   env:
```



Native GPU GitHub Actions Runners

- Windows / Linux T4 GPU runners
 - 4 core / 16 GB RAM / 176GB disk
 - 16GB VRAM
 - runs-on: ubuntu-20.04-gpu-t4-4c-16g-176h
 - runs-on: windows-ds-2019-gpu-t4-4c-16g-176h
 - for pay, so typically to run GPU test suite
- Runner provides NVIDIA driver 535.54.03
- aswf-docker container provides OpenGL dev and runtime environment
 - but no X server: see OpenColorIO for how to use EGL to get OpenGL context
 - would like to research how to provide GLX support



This actually works!

/* ACADEMY
SOFTWARE
FOUNDATION

AcademySoftwareFoundation / wg-ci

<> Code Issues Pull requests 1 Actions Projects Wiki Security Insights

← GPU_TEST

✓ Check for Optix install #16

Summary

Jobs

✓ ubuntu-gpu

Run details

Usage

Workflow file

ubuntu-gpu

succeeded 3 minutes ago in 3s

> ✓ Set up job

✓ run glxinfo inside container

```
1 ▶ Run nvidia-smi
4 Wed May 29 06:30:05 2024
5 +-----+
6 | NVIDIA-SMI 535.54.03                 Driver Version: 535.54.03   CUDA Version: 12.2   |
7 |-----+-----+-----+
8 | GPU   Name                               Persistence-M | Bus-Id        Disp.A | Volatile Uncorr. ECC |
9 | Fan  Temp   Perf          Pwr:Usage/Cap |      Memory-Usage | GPU-Util  Compute M. |
10 |                                           | MIG M.         |                       |
11 |=====+=====+=====+
12 |    0  Tesla T4                        On      000000001:00:00.0 Off |                    |    Off |
13 | N/A   46C    P8              10W / 70W |  2MiB / 16384MiB |      0%   Default |
14 |                                           |                    |                       |
15 |-----+-----+-----+
16
17 +-----+
18 | Processes:                                |
19 | GPU   GI    CI          PID    Type    Process name                        GPU Memory |
20 |      ID    ID                                   ID           |      Usage |
21 |=====+=====+=====+
22 | No running processes found                |            |
23 +-----+
```

✓ Complete job

1 Cleaning up orphan processes

Candidate Projects for GPU Runners

- OpenVDB needs GPU for nanoVDB (?)
- OpenColorIO could transition from Amazon CodeBuild (which requires custom setup per project)
- OpenShadingLanguage
- Others? We want to help
- Running out of monthly funds for GPU accelerated testing would be a good problem to have
- T4 GPUs sufficient?

Static Analysis, Dynamic Analysis and Testing

- ASWF projects use a variety of tools for:
 - Code coverage
 - Static analysis
 - Dynamic analysis
 - Test harness
- Tools required to meet OpenSSF badging requirements
- Projects can help each other
 - OpenEXR has done great work there
- WG-CI Wiki a central place to document (TODO)
- External tools can be set up with an ASWF org and org-level secrets / credentials (SonarCloud)



Sample ASFW Projects on SonarCloud

sonarcloud

?

Log in

Academy Software Foundation

<https://www.aswf.io/> Key: academysoftwarefoundation

Projects
Quality Profiles
Rules
Quality Gates

Filters

Quality Gate

Passed 1

Failed 5

Reliability (Bugs)

A 0 |

B 0 |

C 2

D 0 |

E 4

Security (Vulnerabilities)

A 5

B 1

C 0 |

D 0 |

E 0 |

Security Review (Security Hotspots)

A ≥ 80%

Perspective: Overall Status
Sort by: Name

9 projects

aswf-docker
Failed

Last analysis: June 5, 2022 at 5:00 PM

2 Bugs
0 Vulnerabilities
0.0% Hotspots Reviewed
48 Code Smells
29.6% Coverage
1.5% Duplications
6k Python

aswf-sample-project

Project is not analyzed yet.

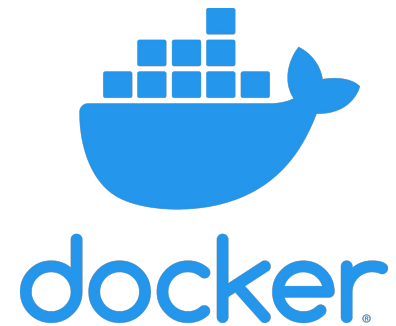
Imath
Passed

Last analysis: August 6, 2022 at 5:44 PM

109 Bugs
0 Vulnerabilities
0.0% Hotspots Reviewed
7k Code Smells
75.3% Coverage
5.7% Duplications
61k C, C++, ...

Packaging and Distribution

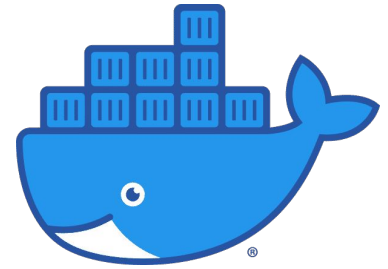
- Python and PyPI
 - Wheels packaging expertise in several projects, ask in #wg-ci
- Paid Docker Hub account for Docker containers
 - No throttling on downloads of aswf-docker containers
 - Available to all projects (GitHub org level secrets)
- JFrog Artifactory
 - <https://linuxfoundation.jfrog.io/artifactory/aswf-conan/>
 - Conan packages from aswf-docker, supports other formats
 - Working towards making Conan packages usable outside of aswf-docker for project dependencies



The aswf-docker Project

<https://github.com/AcademySoftwareFoundation/aswf-docker>

- Created by Aloys Baillet
- Yearly implementation of the VFX Reference Platform
- Hierarchy of layered containers:
 - aswf/ci-base has tools and most prerequisites
 - aswf/ci-openexr is used to build OpenEXR
 - aswf/ci-vfxall has everything pre-built
- Used by most ASWF projects to build in a controlled environment with all required dependencies
- VFX2024 based on Rocky Linux 8, leverages RedHat Developer Toolset 11 for newer dev tools (gcc 11.2.1)
- Clang also included (16 and 17 in 2024)



The aswf-docker Project (cont.)

- Includes CUDA, OpenGL
 - Can be used to run GPU accelerated test suites
 - Can be used to run entire applications
- Can be used to build "difficult to build" open source projects on CentOS 7 by providing updated dependencies and tools
- Pushed to paid for, unthrottled account:
 - <https://hub.docker.com/u/aswf>
 - but 4+ GB vfx-all container can still take a while to pull...

The aswf-docker project: work in progress

- Convert more dependencies and packages to Conan
 - Create Conan packages from build results
 - Push to JFrog Artifactory repository
 - More granularity for clients consuming packages
 - More applicable to Windows and macOS
 - `aswf-docker/packages/conan/recipes/`
- VFX Platform 2024/2025 support
 - Qt6 was a big step for 2024
 - Hoping to release a 2024.1 with updated versions
 - Main transition in 2025 is oneTBB / openMKL from Intel oneAPI



The aswf-docker project: what's next

- Support for new ASWF projects: ORI, OIIO, OpenFX...
 - OIIO hopefully for 2024.1
- Complete transition to Conan for every dependency and package
- Support use of Conan packages without having to build inside container (lighter weight dependencies)
- WINDOWS! (strong feedback from FMX presentation)
 - Leverage CMake / Conan integration to provide simpler Windows builds?
 - Many ASWF projects already have public Conan recipes



Documentation

- ASWF Confluence instance, available to all projects and WGs that want a Wiki
 - wg-ci just started our own
- Paid ReadTheDocs instance (gets rid of small ad / supports the project)
 - current effort to standardize on docs.<project>.org

Challenges

- Leadership
 - How to bring in new participants
 - Where to find external guest speakers
 - No leadership transition planning
- Could use more sustained resource commitment
 - aswf-docker project is "load bearing" for ASWF yet doesn't have any dedicated resources
 - So many opportunities to gather and reuse infrastructure work done in individual projects
 - Not exactly a unique problem...
- Breaks the model
 - Not a project but has deliverables
 - Doesn't have a clear "end" like a WG is supposed to
 - But doesn't really fit being a full project

For Your Consideration

- CI WG provides a unique forum for exchange of development infrastructure information
- Doesn't really compete with other projects for resources (except this annual review...)
- Provides value to ASWF projects in general
- So... renew us?