



## Keeping the HELIPORT Code Base Maintainable

### Our Tools and Approaches

# Contents

- Goals and Challenges
- Choice of Technologies
- Automation and Use of CI/CD

# Goals and Challenges

Main Goal: Community Involvement!

# Goals

## Develop HELIPORT into a Community Project

- Encourage contributions from community members
  - Question, bug report, feature request → [Email](#), [Issue](#) in free text 😊
  - Code contribution → [Merge request](#) ??? 😞
- Code base requirements
  - Adhere to community standards and best practices
  - Extensive and up-to-date documentation
  - Automated tests
  - Static code analysis

# Goals

## Allow For Simple Extension / Make Maintenance of Forks as Easy as Possible

- Work towards a stable `heliport.core v1.0` app that extensions can interface with
- Strict separation of application code / configuration / branding
- Fork at HI Jena (→ see talk on Monday)
- Fork by ALAMEDA team (→ see talk on Monday)
  - Contribution and maintenance of Docker development/production setup (→ see next talk)
  - Contribution refactoring GitLab CI configuration

Phase-resolved Higgs response in superconducting cuprates > Project Configuration

### Project Properties

**HZDR-ID**

HZDR.FWCC.2021.114636

# Challenges

- Small team of core developers
  - Many colleagues contribute great ideas, important feedback, feature requests
  - Only about 2 developers
- We are novice web developers
  - Getting „real“ web devs on board is hard

# Choice of Technologies

# Choice of Technologies

## Well-Established Technologies in the Backend

- Python → most prevalent (general purpose) programming language in science?
- Django
  - Initial release 2005
  - „Batteries included“
    - Admin pages,
    - Authorization
    - Database connection (ORM)
    - Template engine
  - Great documentation and tutorials
  - Vast landscape of third-party libraries and integrations (Django REST Framework, Celery task queue, authentication plugins, ...)

# Choice of Technologies

## In the Frontend ...

- Classic multi-page website
  - Single page applications (e.g. with React or Vue) need to be kept in sync with the backend! → Additional maintenance effort
- Django templates, rendered on the server
- Increase use of HTMX
  - AJAX requests without writing JavaScript / jQuery
  - Declarative approach fits Django templates well
- Experiments with hyperscript and Alpine.js

# Choice of Technologies

## A Touch of the Fancy New World of Web Development

- Package management using Yarn

- package.json and yarn.lock files as central places to define and pin dependencies
- No more rogue <script> tags scattered around dozens of templates, using different versions and checksums
- Temporary solution using django-vendor-files in some places

```
{% vendor_js "codemirror" %}  
{% vendor_js "js-yaml" %}  
{% vendor_js "jsonlint" %}
```

```
<script src="https://code.jquery.com/jquery-3.5.1.js"  
..... integrity="sha256-Qwo7LdVxbWt2tbbQ97B53yJnYU3WhH/C8ycbRAkjPdc="  
..... crossorigin="anonymous"></script>  
<script src="https://code.jquery.com/ui/1.12.1/jquery-ui.min.js"  
..... integrity="sha256-VazP97ZCwtekAsvgPBSUwPFKdrwD3unUfSGVYrahUq="  
..... crossorigin="anonymous"></script>  
<script src="https://cdn.jsdelivr.net/npm/bootstrap@4.5.3/dist/js/bootstrap.bundle.min.js"  
..... integrity="sha384-ho+j7jyWK8fNQe+A12Hb8AhRq26LrZ/JpcUGGOn+Y7RsweNrtN/tE3MoK7ZeZdyx"  
..... crossorigin="anonymous"></script>  
<script src="https://cdnjs.cloudflare.com/ajax/libs/htmx/1.7.0/htmx.min.js"  
..... integrity="sha512-etqA0Kankuxr1SeZDYcQBY/D/KWZn0YZjlsjAo7kCEBTy1gg+DwmR6icxt0ppDB0zm2P00/1SIXEu7K+zvNsg=="  
..... crossorigin="anonymous"  
..... referrerpolicy="no-referrer"></script>
```

```
<script src="https://cdnjs.cloudflare.com/ajax/libs/codemirror/5.62.3/codemirror.js"></script>  
<script src="https://cdnjs.cloudflare.com/ajax/libs/codemirror/5.62.3/mode/yaml/yaml.min.js"></script>  
<script src="https://cdnjs.cloudflare.com/ajax/libs/codemirror/5.62.3/mode/javascript/javascript.min.js"></script>  
<script src="https://cdnjs.cloudflare.com/ajax/libs/codemirror/5.62.3/addon/edit/matchbrackets.min.js"></script>  
<script src="https://cdnjs.cloudflare.com/ajax/libs/codemirror/5.62.3/addon/edit/closebrackets.min.js"></script>  
<script src="https://cdnjs.cloudflare.com/ajax/libs/codemirror/5.62.3/addon/selection/active-line.min.js"></script>  
<script src="https://cdnjs.cloudflare.com/ajax/libs/js-yaml/4.1.0/js-yaml.min.js"></script>  
<script src="https://cdnjs.cloudflare.com/ajax/libs/jsonlint/1.6.0/jsonlint.min.js"></script>  
<script src="https://cdnjs.cloudflare.com/ajax/libs/codemirror/5.62.3/addon/lint/lint.min.js"></script>  
<script src="https://cdnjs.cloudflare.com/ajax/libs/codemirror/5.62.3/addon/lint/yaml-lint.min.js"></script>  
<script src="https://cdnjs.cloudflare.com/ajax/libs/codemirror/5.62.3/addon/lint/json-lint.min.js"></script>
```

# Choice of Technologies

## A Touch of the Fancy New World of Web Development

- Webpack
  - Bundle third-party and custom JS and CSS
  - Optimizations for faster load times are possible (chunking)
  - Customizations of libraries are possible (e.g. compiling Bootstrap from Sass sources)

```
import $ from "jquery";
import "jquery-ui";
import "jquery-ui/ui/widgets/autocomplete";
import "jquery-ui/ui/widgets/draggable";
import Alpine from "alpinejs";
import "bootstrap";
import "htmx.org";
import "htmx.org/dist/ext/client-side-templates";
import "htmx.org/dist/ext/json-enc";

const _hyperscript = require("hyperscript.org");
_hyperscript.browserInit();

window.Alpine = Alpine;
Alpine.start();
```

```
<script src="{% static 'base.js' %}"></script>
```

# Choice of Technologies

## A Brief Look at HTMX – An AJAX-like Request

```
<div hx-trigger="load"  
  ···· hx-get="{% url 'core:maintenance_message' %}"  
  ···· hx-swap="outerHTML"></div>
```

### GET Request to API

```
GET /api/maintenance_message/ HTTP/1.1  
Host: 127.0.0.1:8000  
Accept: */*  
HX-Request: true  
HX-Current-URL: http://127.0.0.1:8000/project/list/
```

### API responds with partial HTML

```
<div class="alert alert-danger">  
  <small>Maintenance</small>  
</div>
```

Maintenance

# Choice of Technologies

## Providing Rendered Partials via API

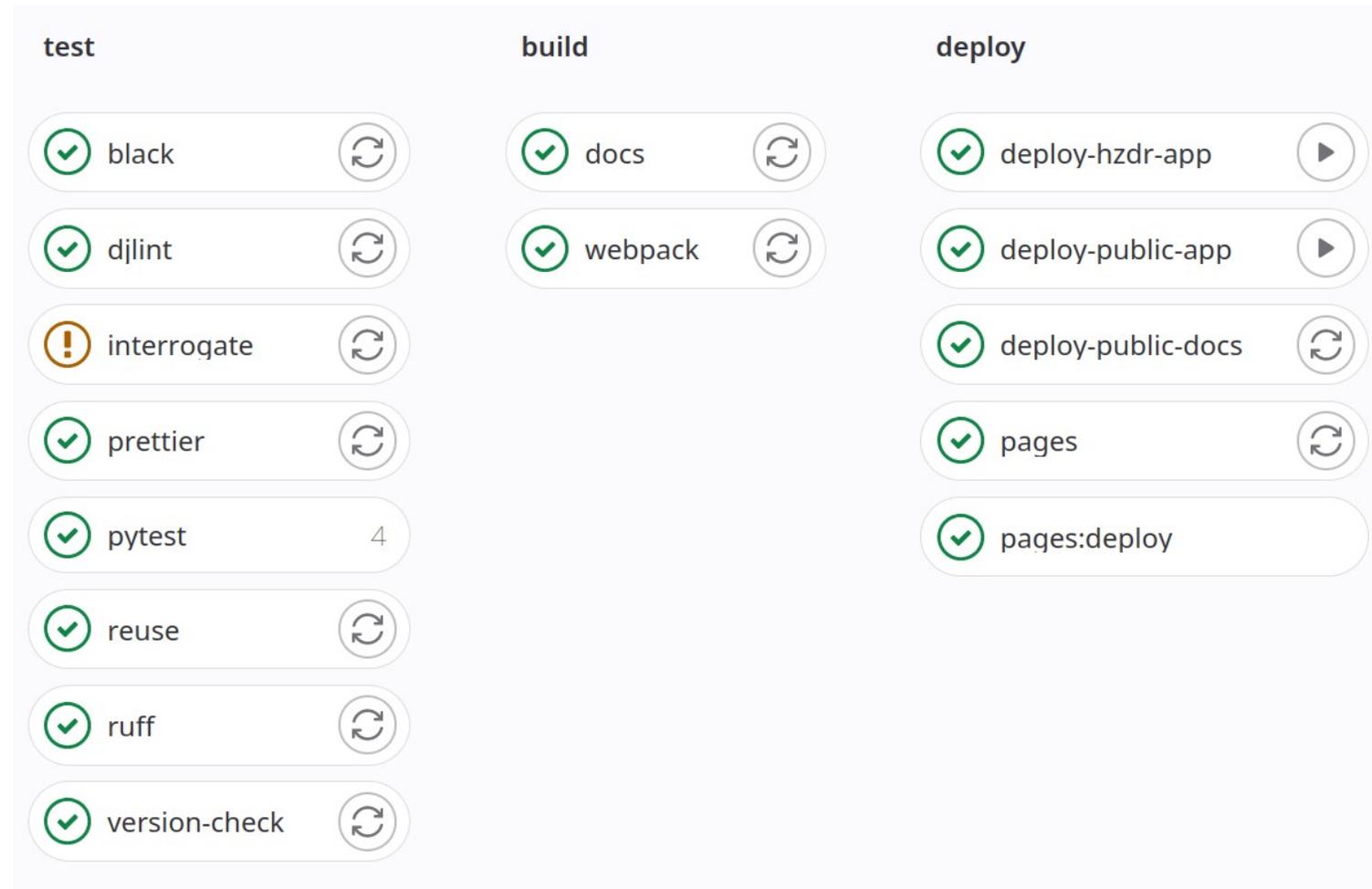
- Implemented with Django REST Framework
  - Custom renderer with format „partial“ (DRF template renderer with a different name)  
GET /api/maintenance\_message/?format=partial HTTP/1.1  
→ returns partial
  - Custom content negotiation  
GET /api/maintenance\_message/ HTTP/1.1  
Accept: text/html  
HX-Request: true  
→ returns partial  
(or any list containing text/html or \*/\*)
- Partials are a great match for the RESTful paradigm
  - REST does not imply JSON!
  - HTML representation of a single resource
- Incentive to keep the API up-to-date!

# Automation and Use of CI / CD

(Continuous Integration / Continuous Delivery)

# CI / CD Pipeline

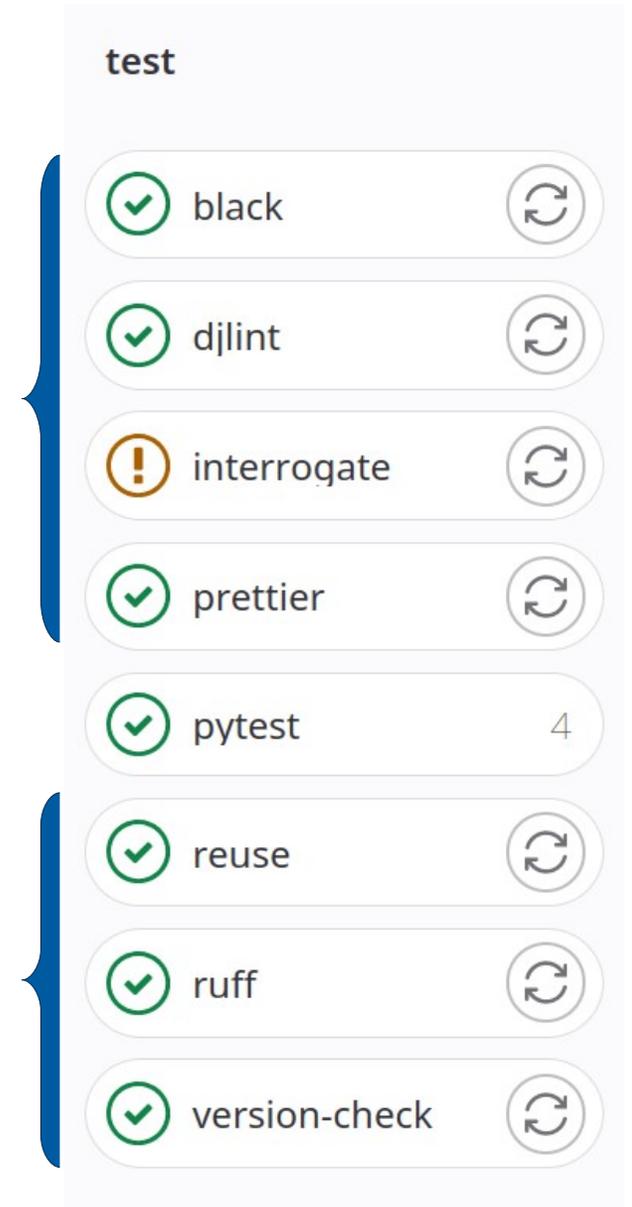
## Overview



# CI / CD Pipeline

## Test Stage – Static Code Analysis

- Finds common bugs
- Can simplify obscure code
- Ensures existence of
  - Copyright headers and license files
  - Docstrings
- Ensures consistent formatting across files



# CI / CD Pipeline

## Test Stage – Test Suite and Code Coverage



HELIPORT

Project ID: 1287 [Leave project](#)

1,851 Commits 3 Branches 1 Tag 2.3 GB Project Storage

version 0.5.0 pipeline **passed** coverage 61.00% lifecycle experimental python ^3.8

heliport/version\_control/models.py

+1 -1  Viewed

```
@@ -615,7 +615,7 @@ def make_token_request(url, login):
615 615     def get_with_token(system: str, url: str, user: HeliportUser, context: Context =
616 616         None):
617 617         """
618 -        Try to find a matching token; use context for caching it.
618 +        Try to find a matching token; use context for caching it.
619 619         """
620 620         info = TokenInfo(system, user)
621 621         if context is not None:
```



pytest

4



pytest: [3.8]



pytest: [3.9]



pytest: [3.10]



pytest: [3.11]



# CI / CD Pipeline

## Build Stage

**build**

docs 

webpack 

HELIPORT

Search docs

USER DOCUMENTATION

- UNICORE Interaction

ADMINISTRATOR DOCUMENTATION

- Prerequisites
- Package Overview
- Deployment
- Admin Commands

DEVELOPER DOCUMENTATION

- Code Documentation (apidoc)
- Module Index
- Getting Started
- Development Setup
- How to Integrate a new Module
- Special Digital Objects
- Metadata Schema

GENERAL

- Index
- Search Page
- Changelog

Home / Welcome to the HELIPORT documentation! [View page source](#)

# HELIPORT HELMholtz Scientific Project WORKflow PlatForm

## Welcome to the HELIPORT documentation!

The documentation is split into three sections: In the user documentation you will find guides for HELIPORT users. The administrator documentation contains information about setup and configuration of HELIPORT instances. The developer documentation consists of documentation about the HELIPORT source code itself and is largely generated from the docstrings in the code.

General information about the HELIPORT project can be found [on our website](#). If you are missing any information related to the topics covered on this site, do not hesitate to reach out to us and ask questions. You can [create an issue on GitLab](#) or [contact us via email](#).

[Next](#) 

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Built with [Sphinx](#) using a [theme](#) provided by [Read the Docs](#).

# CI / CD Pipeline

## Deploy Stage

deploy

- ✓ deploy-hzdr-app ▶
- ✓ deploy-public-app ▶
- ✓ deploy-public-docs ↻
- ✓ pages ↻
- ✓ pages:deploy

<https://vlsdms.fz-rossendorf.de>

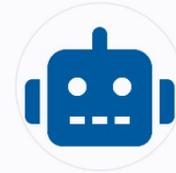
<https://heliport.hzdr.de/app>

<https://heliport.hzdr.de/documentation>

<https://heliport.pages.hzdr.de/heliport>

# Automated Dependency Updates

From Dependabot @hifis-bot



**HIFIS Bot** Busy

 I'm bored of my work

@hifis-bot · User ID: 580  · Member since December 06, 2019

 Dresden, HZDR ·  10:47 AM ·  HIFIS

[hifis.net](https://hifis.net) ·

My icon is licensed under a Creative Commons Attribution 4.0 International -<https://fontawesome.com/license> - license and is provided by FontAwesome - (<https://fontawesome.com/>).

 heliport >  HELIPORT > Merge requests > !425

## Bump djlint from 1.29.0 to 1.30.2

Edit

Code ▾



 Merged HIFIS Bot requested to merge [dependabot/pip/djlint-1.30...](#)  into [master](#)

Jun 5, 2023, 7:03 AM

**Overview** 3

Commits 1

Pipelines 2

Changes 2

All threads resolved! 

Bumps [djlint](#) from 1.29.0 to 1.30.2.

▶ Release notes

▶ Commits



# Thank you for your attention!

Are there any questions?

# Abstract

In this talk, different approaches to keeping the HELIPORT code base maintainable will be presented. The talk will discuss both the tools used to automate various aspects of development and operation of HELIPORT, as well as how certain aspects of development are approached and how the choice of libraries and tooling helps these aspects.