

The UWC-W application infrastructure

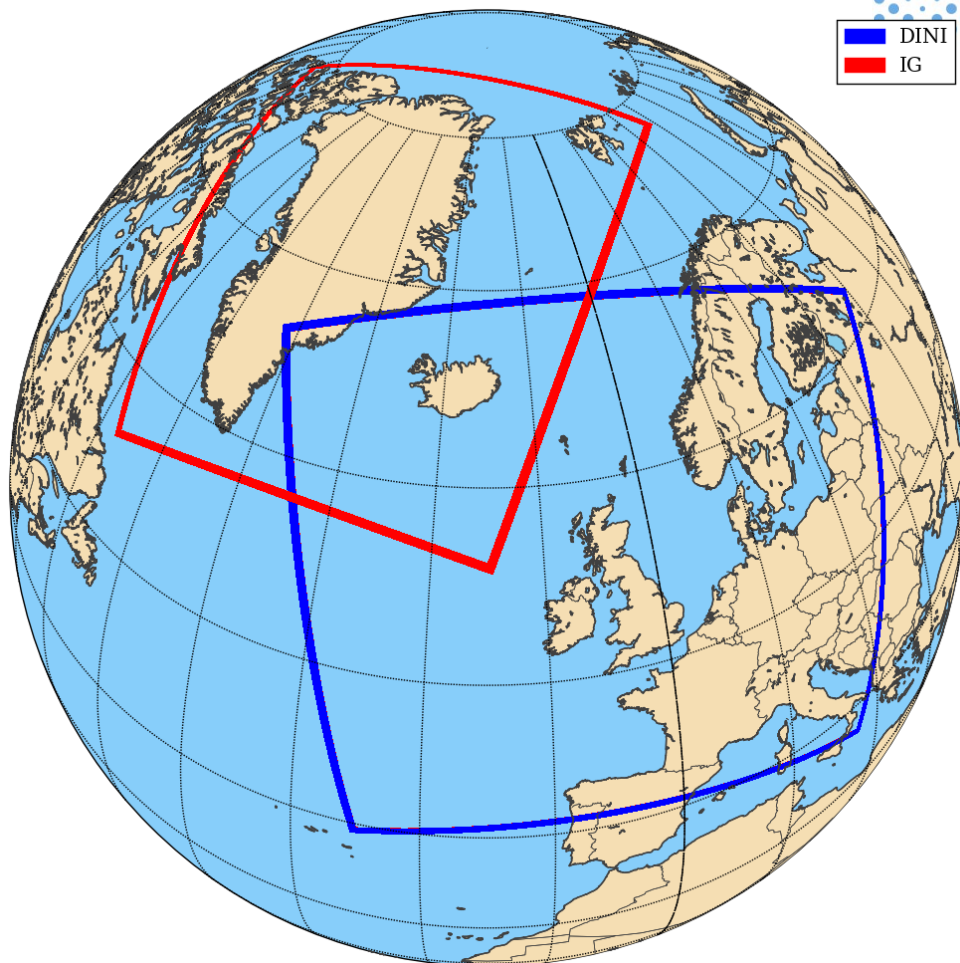
Eoin Whelan

With lots and lots of input from Kasper Hintz, Stefan Rethmeier, Peter Lagoni Kirkemann and many more



Brief update

- HPCs accepted November 2023
- Real-time forecasts since
 - September (IG)
 - December (DINI)
- Operational since March 19th
- More NWP detail in the UWC-W poster and MQA presentation



Some Operational Principles

- All tasks managed using a workflow package (ecFlow)
- All applications managed using CI/CD pipelines

The HPC, the infrastructure and the applications



The HPC, the infrastructure and the applications

- Two HPE Cray systems, one for operational weather forecasting (*aurora*) and the other for weather and climate research (*boreas*)
-- announced November 2021
- A little over a year behind original schedule
- **No interactive usage of aurora, the operational system**
- “*Common*” (UWC-W) and “*National*” Applications

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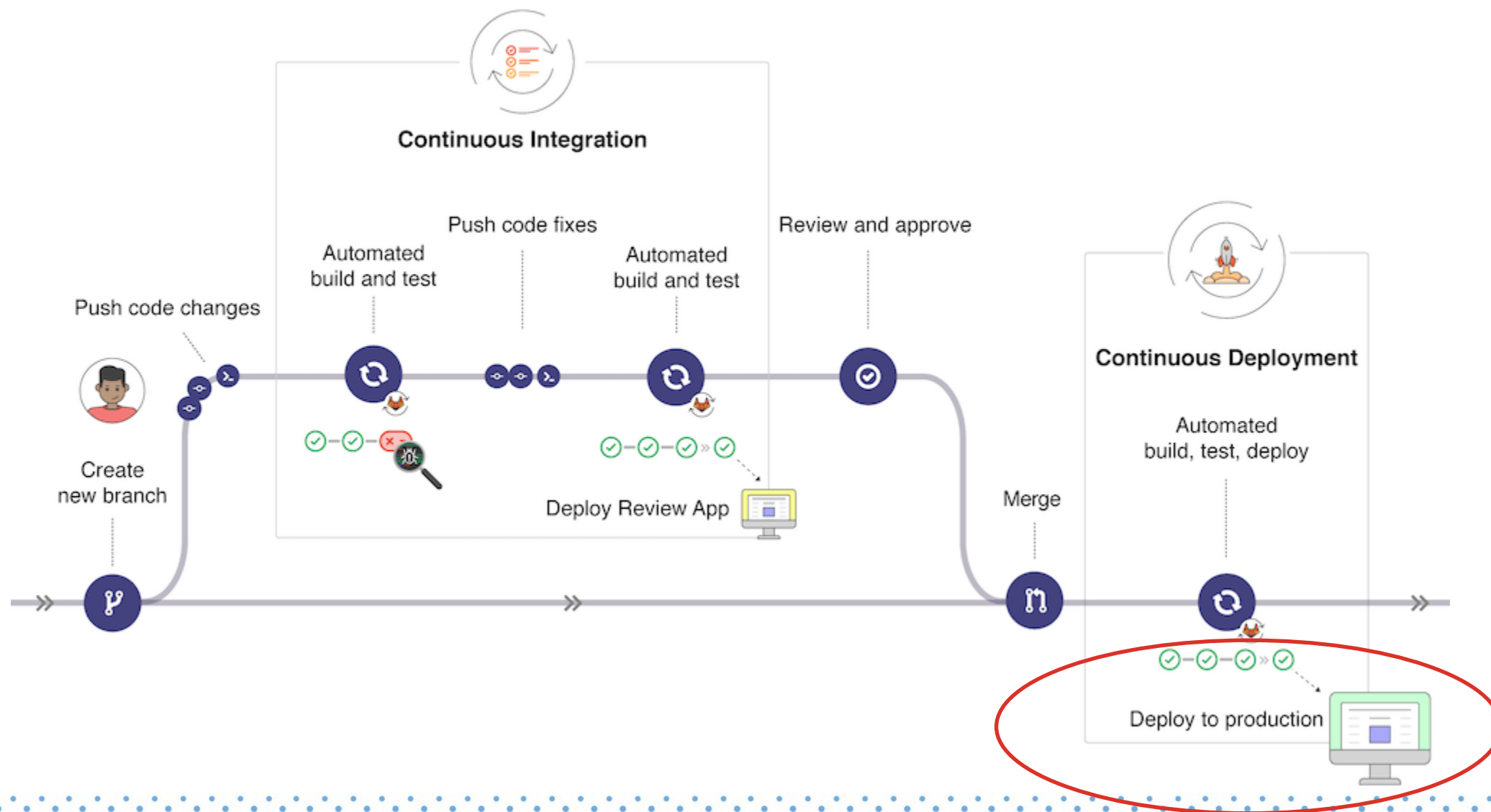


This is what CI/CD can do for you!

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- GitLab CI/CD with AWX is at the heart of everything we do
- *“CI/CD automates much or all of the manual human intervention traditionally needed to get new code from a commit into production ... Get CI/CD right and downtime is minimized and code releases happen faster.”*
- AWX (open-source using Ansible codebase) manages Ansible Playbooks and Credentials; i.e. who does what and where.

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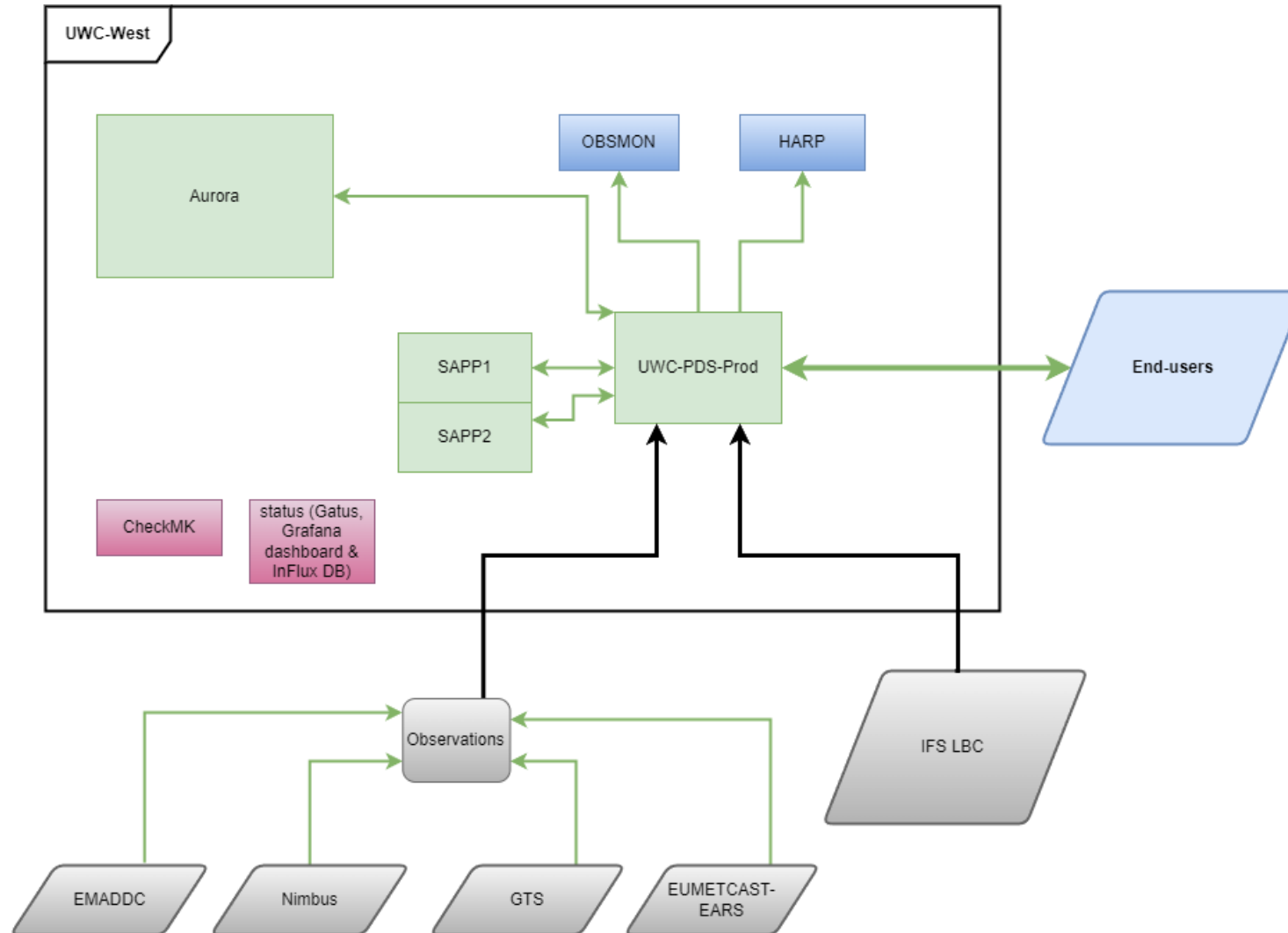
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- With CI/CD we generally take the following steps:
 - Lint - checking of your source code for programmatic and stylistic errors
 - Build – compile (configure & make)
 - *Test – test new developments*
 - Package – bundle everything needed in a zip archive for deployment
 - Deploy – Press play on your Ansible Playbook
- Missing automated testing
 - would be nice to have Unit Tests/Testbed/Davaï
- For now, we use real-time *dev* suites for testing before production

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- Synergies ...
- HIRLAM make use of GitHub Actions
 - “*Automate your workflow from idea to production*”
 - Pull-requests compiled using CMake on Ubuntu 20 to help validate
- Could ACCORD pull requests make use of such Actions?
 - norms checker
 - build
 - test (Davaï and/or others)

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The HPC, the infrastructure and **the applications**

Common projects / **sapp** / mysql_tables / Pipelines / #10930

Merge branch 'feature/amv_geowind' into 'prod'

Warning Rónán Darcy created pipeline for commit `4e5cab78` finished 1 month ago

For `prod`


latest  2 Jobs  1 second, queued for 3 seconds

Pipeline Needs Jobs **2** Failed Jobs **1** Tests **0**

lint

Warning shellcheck 

deploy

Success deployToSapp 


Trigger job

Downstream

Warning sapp deployment #10931 

Multi-project

lint

Success ansible-verify 

Warning pylint 

Warning shellcheck 

deploy

Success deploy_sapp 

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Common projects / [extractGrib](#) / [extractGribConfig](#) / Pipelines / #12882

Merge branch 'feature/eidb_product_anywhere' into 'deploy/development'

✓ Passed **Conor Daly** created pipeline for commit `e92329e9` finished 16 minutes ago

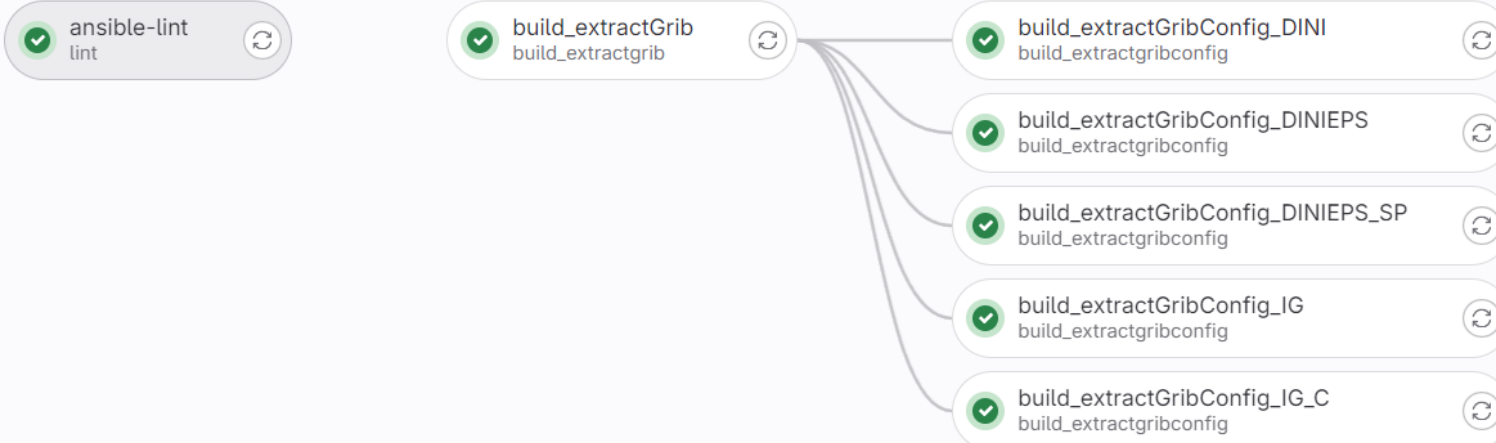
Related merge request [!72](#) to merge [deploy/development](#)

latest [merge request](#) 7 Jobs ⌚ 2 minutes 38 seconds, queued for 1 seconds

Pipeline Needs Jobs **7** Tests **0**

Group jobs by Show dependencies

💡 Tip: Hover over a job to see the jobs it depends on to run.




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Pages / **Documentation** / Pipelines / #12990

Merge branch 'feature/update_harmonie' into 'main'

Delete


✓ Passed Eoin Whelan created pipeline for commit `f75b5e9f`  finished 6 hours ago

For `main`

latest  2 Jobs  5 seconds, queued for 2 seconds

Pipeline Needs Jobs 2 Tests 0

deploy

✓ pages 

✓ pages:deploy

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Common projects / Harmonie / Pipelines / #12817

Merge branch 'feature/reduce_dinieps_dev' into 'deploy/development'

Blocked Eoin Whelan created pipeline for commit `30d0d9cc`

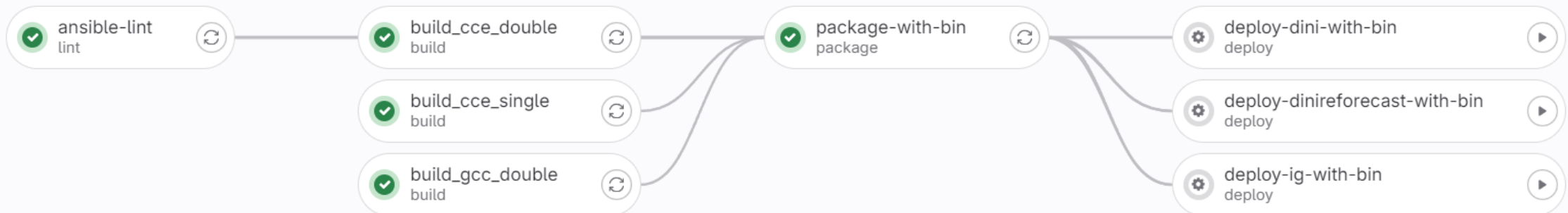
For `deploy/development`

8 Jobs



Pipeline Needs Jobs **8** Tests **0**

Group jobs by Stage Job dependencies Show dependencies

Tip: Hover over a job to see the jobs it depends on to run.



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 .gitlab-ci.yml  10.07 KiB

Blame

Edit ▾

Replace

Delete



```
1 include:
2   - project: "templates/gitlab-ci-templates"
3     ref: main
4     file: "/job-templates/awx-job-template-artifacts.yml"
5
6 stages:
7   - lint
8   - build
9   - package
10  - deploy
11
12 variables:
13   DEPLOY_DEVELOPMENT_BRANCH: "deploy/development"
14   DEPLOY_PRODUCTION_BRANCH: "deploy/production"
15
```

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```

36 .build: &build
37   stage: build
38   tags:
39     - login
40   rules:
41     - if: '$CI_COMMIT_MESSAGE =~ /\[(skip\s|-)build|build\s|-)skip)\]/'
42       when: never
43     - if: '$CI_COMMIT_BRANCH == $DEPLOY_DEVELOPMENT_BRANCH'
44     - if: '$CI_COMMIT_BRANCH == $DEPLOY_PRODUCTION_BRANCH'
45     - if: '$CI_COMMIT_BRANCH == $CI_DEFAULT_BRANCH'
46     - if: '$CI_PIPELINE_SOURCE == "merge_request_event"'
47     changes:
48       - config-sh/config.UWCW.aubo
49       - config-sh/submit.UWCW.aubo
50       - src/*
51       - util/auxlibs/*
52       - util/auxlibs/**/*
53       - util/binutils/*
54       - util/obsmon/*
55       - util/gl/*
56       - util/makeup/*
  
```

If this is a merge request ...

Are changes in these files/directories?

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```
70 script: &build_script
71 - cd src || exit
72 - rm -fv blacklist/{mon_black2018*,mon_black2019*,mon_black2020010200.b,mon_black2020020300.b,mon_black2020030200.b}
73 - time ../util/makeup/configure -d config.UWCW.aubo.${HM_CS} #> "../${FP_PRECISION}_configure.log" 2>&1
74 - WD=$(pwd)
75 - time make CMDROOT="${WD}/../util/makeup" ROOT="${WD}" LIBDISK="${WD}" NPES=8 #> "../${FP_PRECISION}_make.log" 2>&1
76 - cd .. || exit
```



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```
162 .package: &package
163   stage: package
164   tags:
165     - login
166   script:
167     - echo "ARTIFACTS_CI_JOB_ID=${CI_JOB_ID}" > artifacts.env
168   artifacts:
169     paths:
170       - bin/
171       - bin_gcc/
172       - config-sh/config.UWCW.*
173       - config-sh/Harmonie
174       - config-sh/Main
175       - config-sh/submit.UWCW.*
176       - const/
177       - ecf/
178       - nam/
179       - scr/
180       - src/odb/scripts/
181       - src/odb/include/
182       - suites/
183       - util/auxlibs/
184       - util/gl/definitions/
185       - util/gl/scr/alltemp.list
186       - util/gl/scr/allsynop.list
187       - util/obsmon/ddl/
188       - util/obsmon/scr/
189   reports:
190     data: artifacts.env
```

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```
219 .deploy: &deploy
220   extends: .awx-job-template-artifacts
221   stage: deploy
222
223 .deploy-dini: &deploy-dini
224   <<: *deploy
225   environment:
226     name: ${ENVIRONMENT_NAME}/dini
227
228 .deploy-ig: &deploy-ig
229   <<: *deploy
230   environment:
231     name: ${ENVIRONMENT_NAME}/ig
```


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 create_harmonie.yml  7.46 KiB

Blame

Edit ▾

Replace

Delete



```
1 - name: Setting custom facts based on user
2   ansible.builtin.set_fact:
3     hm_lib: '{{ user_home }}/hm_lib/{{ harmexp }}'
4     hm_data: '{{ user_data }}/hm_data/{{ harmexp }}'
5
6 - name: Download artifacts archive
7   ansible.builtin.get_url:
8     url: '{{ artifacts_url }}'
9     headers: '{{ artifacts_headers }}'
10    dest: '{{ user_home }}/harmonie.zip'
11    mode: '644'
12    force: true
13
14 - name: Make hm_lib directory
15   ansible.builtin.file:
16     path: '{{ hm_lib }}'
17     state: directory
18     mode: '755'
```

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```
123 - name: Run Harmonie Setup for production DINIEPS
124 ansible.builtin.shell: /bin/bash -ilc 'export PERL5LIB=$(pwd); config-sh/Harmonie setup -r $(pwd) -h UWCW.aubo -c AURORA_DINIEPS
125 args:
126     chdir: '{{ hm_lib }}'
127 register: harmonie_setup_result
128 failed_when:
129     - harmonie_setup_result.rc != 0
130     - harmonie_setup_result.rc != 1
131 when: harmexp == 'dinieps'
```

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```
183 - name: Continue Harmonie suite
184 ansible.builtin.shell: /bin/bash -ilc 'export EXP={{ harmexp }}; export ECF_PORT={{ ecf_port }}; config-sh/Harmonie continue DTG
185 args:
186     chdir: '{{ hm_lib }}'
187 register: harmonie_continue_result
188 failed_when:
189     - harmonie_continue_result.rc != 0
190     - harmonie_continue_result.rc != 1
191 when: not coldstart
```