Workflow Configuration Import and Validation for AliECS

Final Report
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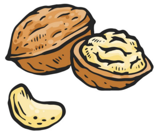
Goals

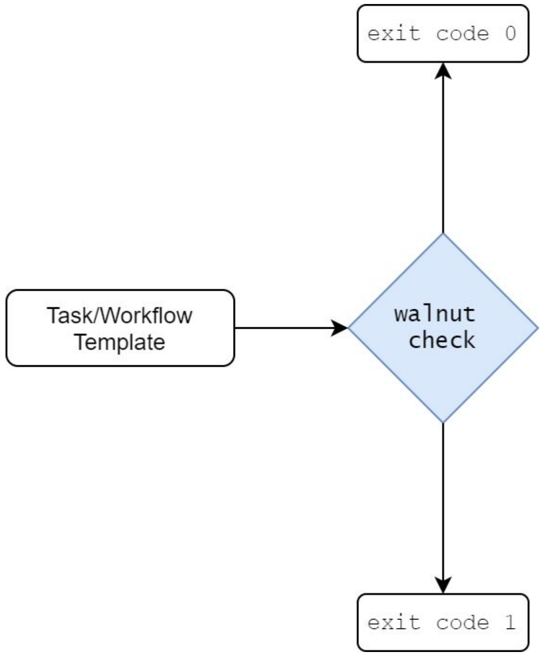
- Convert a DPL Dump generated by O2/DPL into required number of task templates and one workflow template
- Design JSON schemas that describe a structure/pattern for these templates
- Develop a **package to validate** said templates against the schemas without conversion from YAML to JSON or vice versa

All of the above being developed in a package called `walnut` - **W**orkflow **A**dministration and **L**i**n**ting **U**ti**l**ity

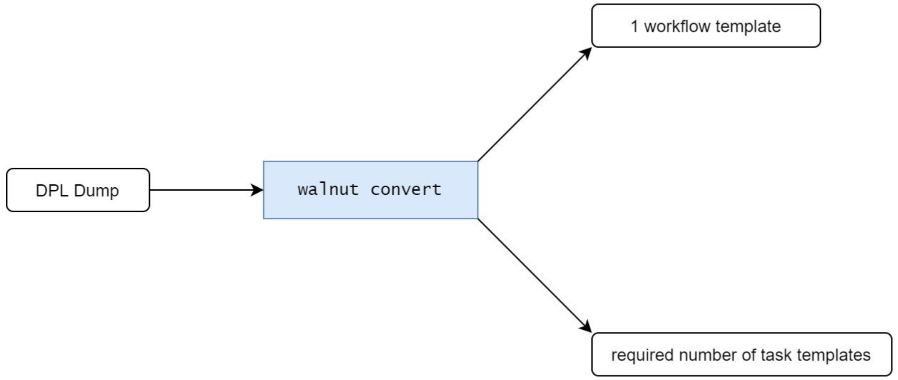


Goals

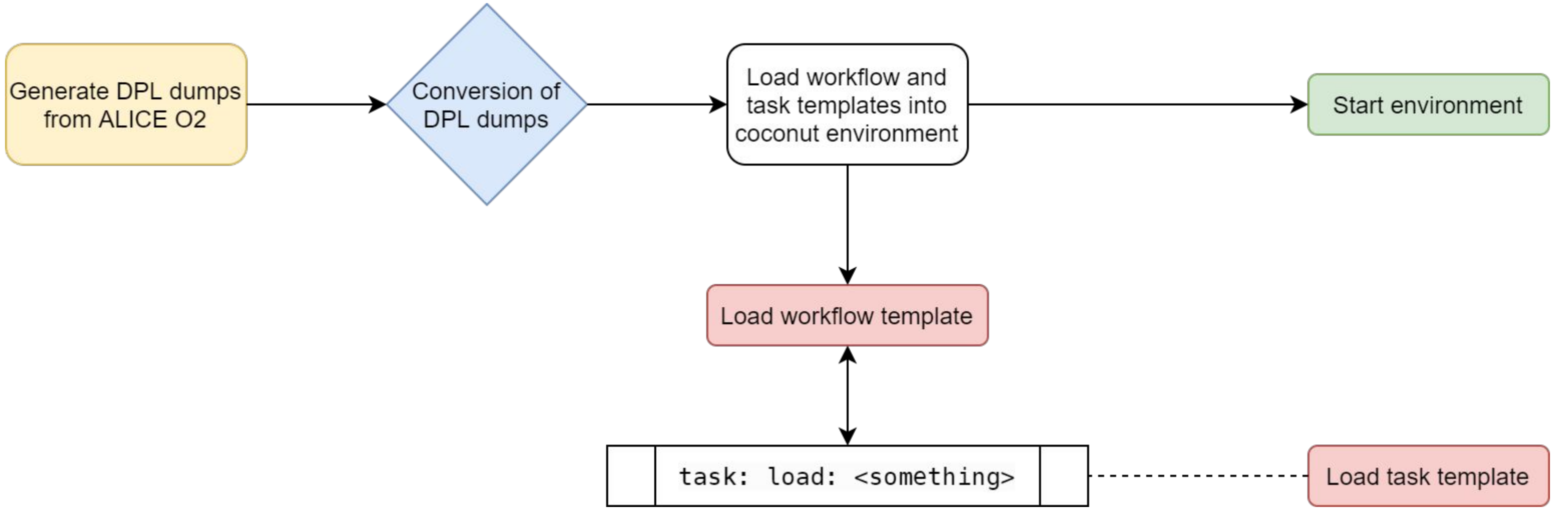
`walnut check`



`walnut convert`



Data Flow


Generate DPL dumps from ALICE O2
Conversion of DPL dumps
Load workflow and task templates into coconut environment
Start environment
Load workflow template
task: load: <something>
Load task template

Validation

Requirements

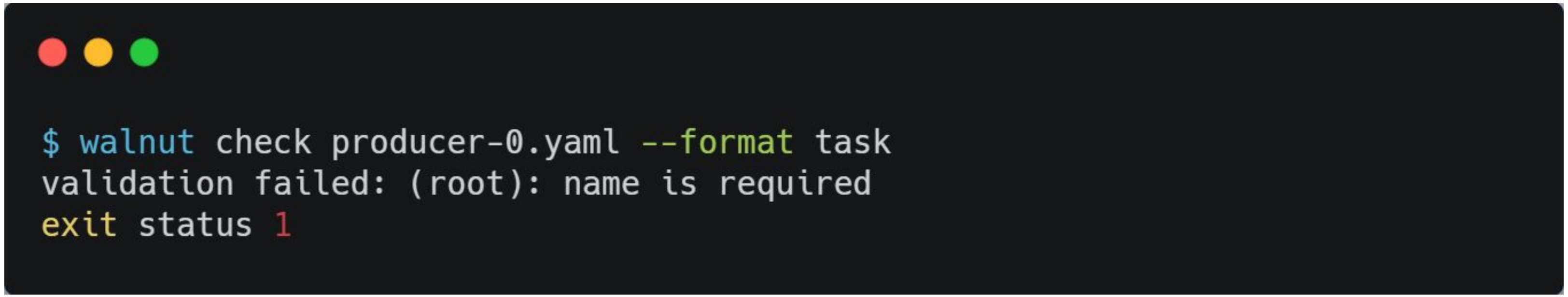
- Define **formal schemas** for AliECS workflow configuration formats (task templates and workflow templates, both of which weren't subject to a formal schema until now).
- Build a package that makes use of these schemas to perform **validation of workflow and task templates** provided as input.

Implementation

- Two schemas (one for WFTs and one for TTs) were defined. These adhere to the requirements defined by AliECS. Currently in the final stages of development.
- Package `schemata` was built that allows the user to verify if a workflow or task template adheres to the aforementioned schema **without conversion** from YAML to JSON.
- Available on the walnut branch of AliceO2Group/Control.

Validation – Example

Upon successful validation, the process exits cleanly. If validation fails, walnut exits with exit code 1 and shows the reason for failure:

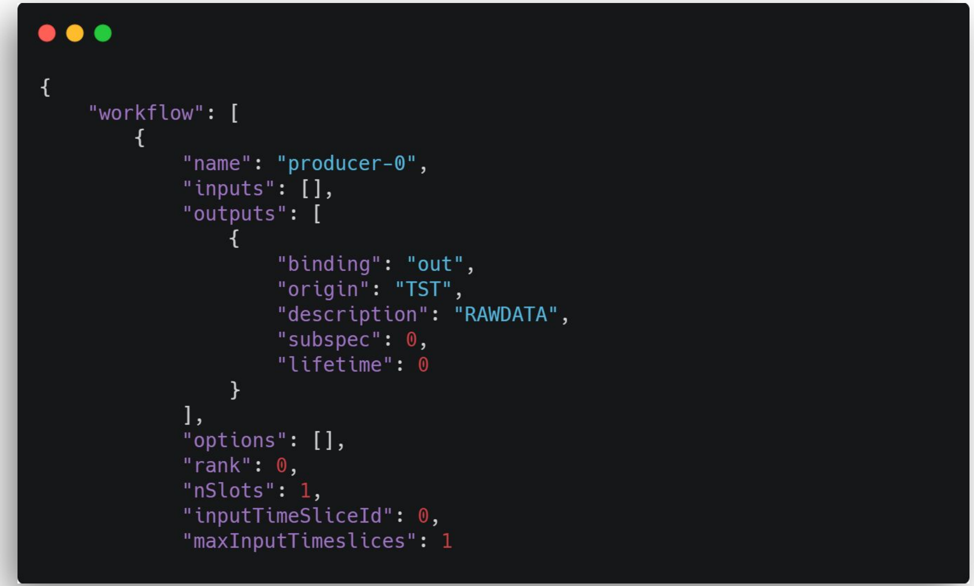


```
$ walnut check producer-0.yaml --format task
validation failed: (root): name is required
exit status 1
```

Conversion

Requirements

- Convert an input DPL dump to workflow and task template formats that AliECS can work with.
- Ensure that any DPL dump can be converted with **minimal or no additional input** from the user.

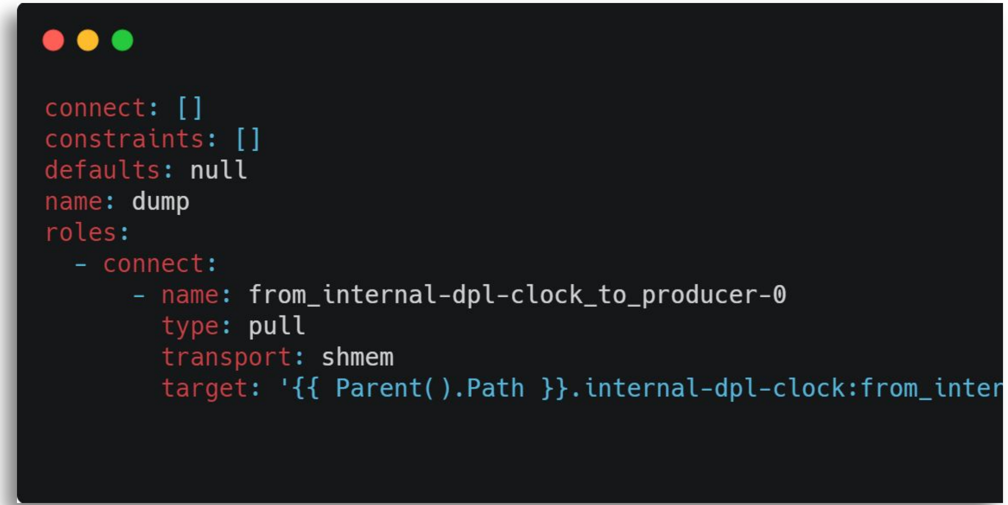


```
{
    "workflow": [
        {
            "name": "producer-0",
            "inputs": [],
            "outputs": [
                {
                    "binding": "out",
                    "origin": "TST",
                    "description": "RAWDATA",
                    "subspec": 0,
                    "lifetime": 0
                }
            ],
            "options": [],
            "rank": 0,
            "nSlots": 1,
            "inputTimeSliceId": 0,
            "maxInputTimeslices": 1
```

Conversion – Implementation

Implementation

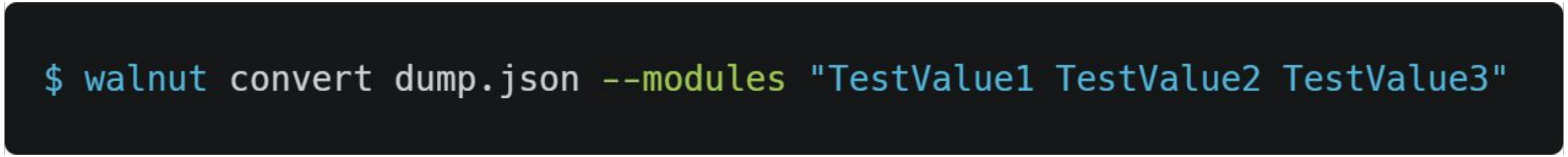
- The implementation of workflow template generation takes advantage of the prior effort on task templates.
- Rather than creating new handlers for WFTs, reused handlers built for conversion of TTs.
- Successful conversion of DPL dump to workflow and task templates was achieved.



```
connect: []
constraints: []
defaults: null
name: dump
roles:
  - connect:
      - name: from_internal-dpl-clock_to_producer-0
        type: pull
        transport: shmem
        target: '{{ Parent().Path }}.internal-dpl-clock:from_inter
```

Conversion – Example

The user provides one or more DPL dumps (as well as some additional flags to provide information which the DPL dump doesn't contain, like `alienv` modules):



```
$ walnut convert dump.json --modules "TestValue1 TestValue2 TestValue3"
```

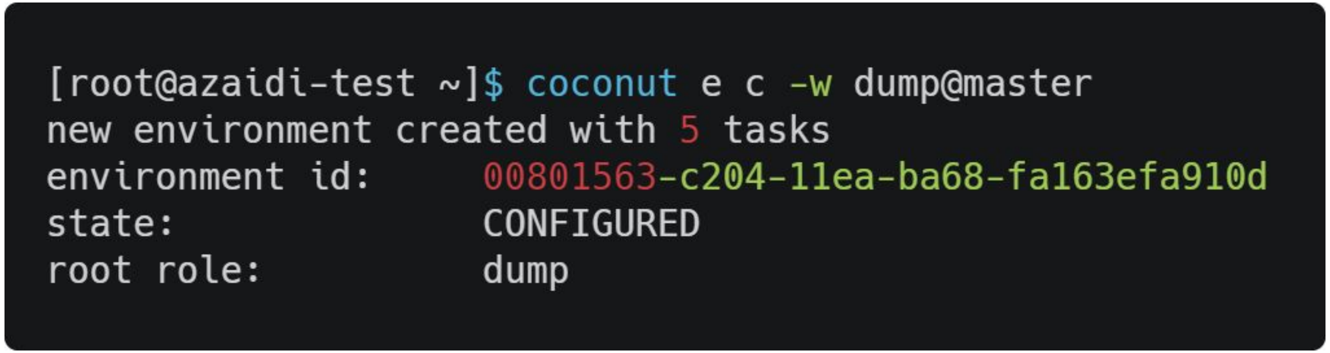
A successful conversion will result in:

- One unified directory for all DPL dumps provided
- Each folder will have subdirectories for tasks and workflows

All the code can be found at AliceO2Group/Control.

Workflow Deployment

Once the converted WFTs and TTs are placed into a git repository, committed and pushed, they can be accessed from `coconut`. From here, they can be used to create environments:



```
[root@azaidi-test ~]$ coconut e c -w dump@master
new environment created with 5 tasks
environment id:     00801563-c204-11ea-ba68-fa163efa910d
state:              CONFIGURED
root role:          dump
```

Thank you.