Prototyping a Cromwell Parsl Backend

Kelly L. Rowland, Ph.D.
NERSC Data Science Engagement Group
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Cromwell
Cromwell

• “Workflow Management System geared towards scientific workflows”
• Developed by Broad Institute of MIT and Harvard
  o Biomedical and genomic research center
• Workflow input defined using one of:
  o Workflow Description Language (WDL)
  o Common Workflow Language (CWL)
• Runs on a multitude of platforms
  o Local instances
  o HPC schedulers - Slurm, SGE
  o Cloud providers - AWS, GCP
  o How? **Scripts are generated and sent to backends.**
Cromwell Backends

```yaml
backend {
    providers {
        example_backend {
            config {
                <options>
                submit = "/usr/bin/env bash ${script}"
            }
        }
    }
}
```
Parsl Backend Prototype
Cromwell Backend

backend {
    providers {
        example_backend {
            config {
                <options>
                submit = "/usr/bin/env bash ${script}"
            }
        }
    }
}
Cromwell Backend, but Make it Parsl

```plaintext
backend {
  providers {
    parsl_backend {
      config {
        <options>
        submit = "python parsl_test.py ${script}" 
      }
    }
  }
}
```
parsl_test.py

<Parsl imports>
import sys

script = sys.argv[1]

config = Config( <htex, label='cori', SlurmProvider> )

load(config)

@bash_app(executors=['cori'])
def run_script(script):
    cmd = '/usr/bin/env bash ' + script
    return cmd

script_out = run_script(script)
JAWS (or: “Why are you doing this?”)
JAWS - JGI Analysis and Workflow System

• Developed by Joint Genome Institute
  o U.S. Dept. of Energy national user facility
  o DNA sequencing and other advanced genomic technologies
• Framework to run computational workflows
• Intended to improve re-usability and robustness of workflows in HPC environments
• Recently cleared for source code release!
  o Stay tuned
JAWS - JGI Analysis and Workflow System
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Cromwell → RMQ connector, invoked with Parsl backend

Launched as a service
Parsl Wish Item

• More flexibility in executors
  o Caveat to this: investigating Work Queue is on the to-do list
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