Mabinogi g21 guide

Argo is an open source project that provides container-native workflows for Kubernetes. Each step in an Argo workflow is defined as a container. Argo is implemented as Kubernetes Custom Resource Definition (CRD). As a result, Argo workflows can be managed with kubectl and are natively integrated with other Kubernetes services such as Volumes, Secrets, and RBAC. The new Argo software is lightweight and installed in less than a minute and offers complete workflow functions such as parameter substitution, artifacts, fixtures, loops and recursive workflows. Many of the Argo samples used in this walkthrough are available in this directory. If you like this project, please give us a star! For a complete description of the Argo workflow specification, see our specification definitions. Table of Contents - Argo CLI- If you want to follow this walkthrough, here is a brief overview of the most useful Argo Command Line Interface (CLI) commands . argo submit hello-world.yaml - send a workflow specification to Kubernetes argo list - list current workflows argo get hello-world-xxx - get information about a specific workflow argo-logs hello-world-xxx - print the logs from a workflow argo delete hello-world-xxx - delete workflow specifications directly with kubectl but the Argo CLI provides syntax checking, nicer e.V. kubectl create -f hello-world.yaml kubectl get wf kubectl get wf hello-world-xxx kubectl get po --selector=workflows.argoproj.io/workflow=hello-world-xxx --show-all argo kubectl logs hello-world-xxx-yyy -c main kubectl delete You can do this directly from your shell with a simple Docker command: docker run docker/whalesay cowsay hello world ______ &lt; hello world &gt; ------------- ' .###' . ___/ === . This message indicates that your installation appears to be working properly. Below, we run the same container in a Kubernetes cluster using an Argo workflow template. Be sure to read the comments as they provide useful explanations. apiVersion: argoproj.io/v1alpha1 Type: Workflow - new type of k8s spec Metadata: generateName: hello-world- - Workflow specification name: Entrypoint: Whalesay - call the Walsay templates templates: - Name: Walsay - Name of template container Picture: docker/whalesay command: [cowsay] args: [hello world] resources: 'Limit the resources limits: memory: 32Mi cpu: 100m Argo adds a new art of Kubernetes spec called a workflow. The above specification contains a single template called Whalesay, which operates the Docker/Whalesay container and calls Kuhsay World. The Walsay template is the entry point for the specification. The entry point specifies the initial template to call when the workflow specification is run by Kubernetes. The ability to specify the entry point is more useful if more than one template is defined in the Kubernetes workflow specification. :-) Parameter. Let's consider a slightly more complex workflow specification with parameters. apiVersion: argoproj.io/v1alpha1 Type: Workflow metadata: generateName: hello-world-parameters- spec: - invoke the whalesay template with ''hello world' as the argument ' to the message parameter entrypoint: whalesay arguments: parameters: - name: message value: hello world templates: - name: whalesay inputs: parameters: - name: message • Parameter declaration container: - run cowsay with this message input parameter as an args image: docker/whalesay command: [cowsay] args: ['inputs.parameters.message'] This time, the Walsay template takes an input parameter named message, which is passed as args to the Cowsay command. To refer to parameters (e.B. Inputs.parameters.message), the parameters must be enclosed in double quotation marks to escape the curly braces in YAML. The argo CLI provides a convenient way to override parameters used to call the entry point. The following command would, for example.B bind the message parameter to Goodbye World instead of the default Hello World. argo submit arguments-parameters.yaml -p message=goodbye world For multiple parameters that can be overited, the argo CLI provides a command for loading parameter files in YAML or JSON format. Here is an example of this type of parameter file: To run, use the following command: argo submit arguments-parameters.yaml --parameter-file params.yaml command line parameters can also be used to override the default entry point and call any template in the workflow specification. For example, if you add a new version of the Walsay template called Whalesay Caps .B but don't want to change the default entry point, you can call it from the command line as follows: argo submit arguments-parameters.yaml --entrypoint whalesay-caps By using a combination of the --entrypoint and -p parameters, you can call any template in the workflow specification with any parameter. The values set in the spec.arguments.parameters are globally limited and can be called from the workflow.parameters.parameter_name file. This can be useful for passing information to multiple steps in a workflow. For example, if you want to run your workflows at different levels of logging that are each container, you can have a YAML file similar to this: apiVersion: argoproj.io/v1alpha1 Type: Workflow Metadata: generateName: global-parameters-spec: Entrypoint: A arguments: parameters: parameters: - name: log-level value: INFO templates: - name: A container: image: containerA env: - name: LOG_LEVEL LOG_LEVEL Command -workflow.parameters.log-level- command: [runA] - name: B container: image: containerB env: - name: LOG_LEVEL value: -workflow.parameters.log-level Command: [runB] In this workflow, both steps A and B would be set to INFO and can be easily changed between workflow submissions with the -p flag. Steps. In this example, you'll learn how to create tiered workflows, how to define more than one template in a workflow specification, and how to create nested workflows. Be sure to read the comments as they provide useful explanations. apiVersion: argoproj.io/v1alpha1 Type: Workflow Metadata: generateName: steps-spec: entrypoint: hello-hello-hello - This specification contains two templates: hello-hello-hello and whalesay templates: - Name: hello-hello-hello - Instead of just running a container. This template has a sequence of steps: - Name: hello1 - hello1 runs before the following step template: Whalesay arguments: Parameters: - Name: Message value: hello1 - - Name: hello2a - Double Dash =&gt; run according to previous step template: Whalesay arguments: Parameters: - Name: Message value: hello2a - Name: hello2b - Single Dash =&gt; Run parallel to the previous step template: Whalesay arguments: Parameters: - Name: Message value: hello2b - This is the same template as from the previous example - Name: Whalesay inputs: Parameters: - Name: Message container: Image: docker/whalesay command: [cowsay] args: [-inputs.parameters.message.message]] The above workflow specification prints three different flavors of hello. The Hello-hello-hello template consists of three steps. The first step, named hello1, is performed sequentially, while the next two steps are performed in parallel with the names hello2a and hello2b. The argo CLI command allows us to graphically view the execution history of this workflow specification, which shows that the steps named hello2a and hello2b were performed in parallel with each other. STEP TEMPLATE PODNAME DURATION MESSAGE ✔ steps-z2zdn hello-hello-hello '✔ hello1 whalesay steps-z2zdn-27420706 2s '┬'✔ hello2a whalesay steps-z2zdn-200676009 ✔ As an alternative to specifying sequences of steps, you can define the workflow as a directed-acyclic diagram (DAG) by specifying the dependencies of each task. This can be easier for complex workflows to manage and allows maximum concurrency when performing tasks. In the following workflow, step A is executed first because it has no dependencies. Once A is complete, steps B and C run in parallel. When B and C are complete, step D can be performed. apiVersion: argoproj.io/v1alpha1 Type: Workflow Metadata: generateName: dag-diamond-spec: diamond templates: - name: echo inputs: - name: - name: message container: image: alpine:3.7 command: [echo, 'inputs.parameters.message'']] - Name: diamond dag: aufgaben: aufgaben: Name: A template: Echo arguments: Parameters: [Name: Message, value: A'] - name: B dependencies: [A] template: echo arguments: parameters: ['name: message, value: B'] - name: C dependencies: [A] template: echo arguments: parameters: parameters: ['name: message, value: C'] - name: D dependencies: [B, C] template: echo arguments: parameters: ['name: message, value: D'] The templates called from a DAG or step template can be DAG or step templates themselves. In this way, complex workflows can be divided into manageable parts. The DAG logic has a built-in error quick function to stop scheduling new steps when it detects that one of the DAG nodes has failed. It then waits for all DAG nodes to complete before the DAG itself stops running. The FailFast flag standard is true, if set to false, allows a DAG to execute all branch offices of the DAG to completion (either success or failure), regardless of the failed results of branches in the DAG. More information and examples of this feature can be found here. Note on artifacts: You must configure an artifact repository to run this example. Configure an artifact repository here. When running workflows, it is very common to have steps that generate or use artifacts. Often, the output artifacts of a step can be used as input artifacts for a subsequent step. The following workflow specification consists of two steps that run sequentially. The first step, named generate-artifact, generates an artifact using the Walsay template, which is consumed by the second step called the Print Message, which then consumes the generated artifact. apiVersion: argoproj.io/v1alpha1 Type: Workflow metadata: generateName: artifact-passing- spec: entrypoint: artifact-example templates: - name: artifact-example steps: - - name: generate-artifact template: whalesay - - name: consume-artifact template: print-message arguments: artifacts: ' bind the message to the Hello Art artifact - generated by the Generate Artifact step - Name: Message from: -steps.generate-artifacts.outputs.artifacts.hello-art - Name: Walsay container: Image: docker/whalesay:latest- Command: [sh, -c] args: [cowsay hello world | tee /tmp/hello_world.txt] outputs: Artifacts: ' generate hi-art art art from /tmp/hello_world.txt ' Artifacts can be directories as well as files - Name: hello-art path: /tmp/hello_world.txt - Name: print -message inputs: artifacts: ' unpack the message input artifact ' and set it to /tmp/message - Name: /tmp/ message container: -c] args: [cat /tmp/message] The Walsay template uses the cowsay command, to file named /tmp/hello-world.txt. This file is then output as an artifact named hello-art. In general, the path of the artifact can be a directory rather than just a file. The print message template takes an input artifact named Message, unpacks it /tmp/message and then prints the contents of /tmp/message with the Cat command. The artifact sample template passes the Hello Art Artifact generated as output of the Generate Artifact step as a message entry artifact for the print message step. DAG templates use the task prefix to refer to another task, e.B. tasks.generate-artifact.outputs.artifacts.hello-art. Artifacts are packaged and zipped as tarballs by default. You can customize this behavior by specifying an archive strategy using the archive field. For example: &lt;... snipped ... &gt; outputs: Artifacts: - default behavior - tar+gzip standard compression. - Name: hello-art-1 path: /tmp/hello_world.txt - disable archiving completely - download the file/ the directory as it is. - this is useful if the container layout matches the desired target repository layout. - Name: hello-art-2 path: /tmp/hello_world.txt archive: none: , - adjust the compression behavior (disable it here). - e.B. Disable compression for a cached build workspace and large binaries, or increase compression for perfect text data - like a json/xml export of a large database. - Name: hello-art-3-Path: /tmp/hello_world.txt Archive: tar: ' no compression (also accepts the default gzip 1 to 9 values) compressionLevel: 0 &lt;... snipped ... &gt; The Structure of Workflow Specs. We now know enough about the basic components of a workflow specification to verify its basic structure : Kubernetes header including metadata Spec body Entrypoint call with optional end list of template definitions For each template definition name of template Optionally a list of outputs container call (sheet template) or a list of steps for each step, A template call Together, workflow specifications are composed of a set of Argo templates, where each template consists of an optional input section, an optional output section, and either a container call or a list of steps where each step calls a different template. Note that the container section of the workflow specification accepts the same options as the container section of a pod specification, including, but not limited to, environment variables, secrets, and volume mounts. The same applies to volume claims and volumes. Secrets- Argo supports the same secret syntax and mechanisms as Kubernetes pod specifications, which allow access to secrets as environment variables or volume mounts. For more information, see the Kubernetes documentation. To run this example, first create the secret by --kubectl create secret generic my-secret --from-literal=mypassword=Mypassword=S00perS3cretPa55word apiVersion: argoproj.io/v1alpha1 Type: Workflow metadata: generateName: secret-example-spec: entrypoint: whalesay - To access secrets as files, add a volume entry in spec.volumes[] and - then in the container. added. specification, add a bracket with volumeMounts. Volumes: - Name: my-secret-vol secret: secretName: my-secret - Name of an existing k8s secret templates: - Name: Walsay container: Image: alpine:3.7 Command: [sh, -c] args: [' echo secret from env: $MYSECRETPASSWORD; echo secret from file: 'cat /secret/mountpath/mypassword' '] ' To access secrets as environment variables, use the k8s value env: - name: MYSECRETPASSWORD ' name of env var valueFrom: secretKeyRef: name: my-secret ' name of an existing k8s secret key: mypassword ' key' subcomponent of the secret volumeMounts: - name: my-secret-vol ' mount file containing secret at /secret/mountpath mountPath: /secret/mountpath Scripts Results' We only want a template that runs a script that is specified as a Here script (also known as a document here) in the workflow specification. This example shows that how to do this: apiVersion: argoproj.io/v1alpha1 Type: Workflow metadata: generateName: scripts-bash-spec: entrypoint: bash-script-example templates: - name: bash-script-example steps: - - name: generate template: gen-random-int-bash - - name: Druck template: print-message arguments: parameters: - name: message value: ''steps.generate.outputs.outputs.result'' ' The result of the here-script - name: gen-random-int-bash script: image: debian:9.4 command: [bash] source: | • Contents of the Here Script cat /dev/urandom | od -N2 -An -i | awk -v f=1 -v r=100 ''printf '%i', f + r * '1 / 65536' - Name: gen-random-int-python script: image: python:alpine3.6 command: [python] source: | import random i = random.randint(1, 100) print(i) - name: gen-random-int-javascript script: image: node:9.1-alpine command: [node] source: | var rand = Math.floor(Math.random() * 100); console.log (edge); - Name: print-message-Inputs: Parameters: - Name: Message container: Image: alpine:latest Command: [sh, -c] args: [echo result was: 'inputs.parameters.message'] The script keyword allows the specification of the script text using the source tag. This creates a temporary file that contains the script text, and then the name of the temporary file is passed as the last parameter to the command, which should be an interpreter that executes the script text. Using the script function also assigns the default output of running the script to a special output parameter called result. This allows you to use the result of running the script itself in the rest of the workflow specification. In this example, the print message template simply renders the result. Output Parameters - Output parameters provide a common mechanism to use the result of a step as a parameter, not an artifact. In this way, you can select the result from each step type, not just a script for conditional testing, loops, and arguments. Output parameters work similarly to the script result, except that the value of the output parameter to the einer generierten Datei und nicht den Inhalt von stdout. apiVersion: argoproj.io/v1alpha1 kind: Workflow metadata: generateName: output-parameter- spec: entrypoint: output-parameter templates: - name: output-parameter steps: - - name: generate-parameter template: whalesay - - name: consume-parameter template: print-message arguments: parameters: # Pass the hello-param output from the generate-parameter step as the message input to print-message - name: message value: {{steps.generate-parameter.outputs.parameters.hello-param}} - name: whalesay container: image: docker/whalesay:latest command: [sh, -c] args: [echo -n hello world &gt; /tmp/hello_world.txt] # generate the content of hello_world.txt outputs: parameters: - name: hello-param # name of output parameter valueFrom: path: /tmp/hello_world.txt # set the value of hello-param to the contents of this hello-world.txt - name: print-message inputs: parameters: - name: message container: image: docker/whalesay:latest command: [cowsay] args: [{{inputs.parameters.message}}] DAG templates use the tasks prefix to refer to another task, for example {{tasks.generate-parameter.outputs.parameters.hello-param}}. Schleifen- Beim Schreiben von Workflows Es ist oft sehr nützlich, über eine Reihe von Eingaben zu iterieren, wie in diesem Beispiel gezeigt: apiVersion: argoproj.io/v1alpha1 Art: Workflow-Metadaten: generateName: generateName: loops- spec: entrypoint: loop-example templates: - name: loop-example steps: - - name: print-message template: whale Say-Argumente: Parameter: - Name: Nachrichtenwert: -item withItems: - invoke whalesay once for each item parallel - hello world - item 1 - goodbye world - item 2 - name: whalesay inputs: parameters: - name: message container: image: docker/whalesay:letzter Befehl: [cowsay] args: ['inputs.parameters.message'] Wir können auch über Satzsätze iterieren: apiVersion: argoproj.io/v1alpha1 Art: Workflow-Metadaten: generateName: loops-maps- spec: entrypoint: loop-map-example templates: - name: loop-map-beispielschritte: - - name: test-linux template: cat-os-release arguments: parameters: - name: image value: ''item.image'' - name: tag value: ''item.tag'' withItems: - ' image: 'debian' , tag: '9.1' - #item Set 1 - ' image: 'debian', tag : '8.9' ' #item set 2 - ' image: 'alpine', tag: '3.6' - #item Set 3 - ' Bild: 'ubuntu', Tag: '17.10' ' #item Set 4 - Name: cat-os-release-Eingänge: Parameter: - Name: Bild - Name: Tag-Container: Bild: Bild: Befehl: [/etc/os-release] Wir können Listen von Elementen als Parameter übergeben: apiVersion: argoproj.io/v1alpha1 Art: Workflow-Metadaten: generateName: loops-param-arg- spec: entrypoint: loop-param-arg-beispielargumente: Parameter: - Name: os-list [- image: debian, tag: 9.1, image: debian, tag: 8.9, image: alpine, tag: 3.6, image: ubuntu, 17.10] Templates: - Name: loop-param-arg-example-Inputs: Parameters: - Name: os-list Steps: - - Name: test-linux template: cat-os-release-Arguments: Parameters: - Name: Image value: -item.image - Name: Tag-value: -item.tag- mitParam: -inputs. The parameter specifies the list to iterating over the list - This template is the same as in the previous example - Name: cat-os-release-Inputs: Parameters: - Name: Image - Name: Tag-Container: Image: -inputs.parameters.image: inputs.parameters.tag Command: [cat] args: [/etc/os-release] We can even dynamically generate the list of elements! apiVersion: argoproj.io/v1alpha1 Type: Workflow metadata: generateName:

loops-param-result- spec: entrypoint: loop-param-result-example templates: - name: loop-param-result-example steps: - - name: generate template: gen-number-list - Iterate over the list of numbers generated by the generating step above - - name: sleep-n-sec-arguments: parameters: - Name: Second value: -item withParam: -steps.generate.outputs.outputs.result - Generate a list of numbers in JSON format - Name: gen-Number-List script: Image: python:alpine3.6-Command: [python] source: | import json import sys json.dump([i for i in range(20, 31)], sys.stdout) - name: sleep-n-sec inputs: Parameters: - Name: Second container: Image: alpine:latest command: [sh, -c] args: [echo sleeping for 'inputs.parameters.seconds' seconds; Sleep-Inputs.parameters.seconds; echo done] Conditionals. We also support conditional execution, as shown in this example: apiVersion: argoproj.io/v1alpha1 Type: Workflow metadata: generateName: coinflip- spec: entrypoint: coinflip templates: - name: coinflip steps: ' flip a coin - - name: flip-coin template: flip-coin ' evaluate the result in parallel - - name: heads template: heads ' call heads template if heads steps.flip-coin.outputs.outputs.result - Name: Tails template: Tails , Call tails template, if tails if: -steps.flip-coin.outputs.outputs.result == Tails - Return heads or tails based on a random number - Name: Flip-Coin Script: Image: python:alpine3.6 Command: [python] Source: | import random result = heads if random.randint(0,1) == 0 else tails print(result) - Name: heads container: image: alpine:3.6 command: [sh, -c] args: [echo 'it was heads]] - name: tails container: image: alpine:3.6 command: [sh, -c] args: [echo's war tails]] Failed repeat or erroneous steps. You can specify a retry strategy that dictates how to repeat failed or erroneous steps: - this example illustrates the use of retry backs apiVersion: argoproj.io/v1alpha1 art: workflow metadata: generateName: retry-backoff- spec: entrypoint: retry-backoff templates: - name: retry-backoff retryStrategy: limit: 10 retryPolicy: Always backoff: duration: 1 - Must Default unit is seconds. Could could a duration, e.B:2m, 6h, 1d factor: 2 maxDuration: 1m - Must be a string. Default unit is seconds. Could also be a duration, e.B.: 2m, 6h, 1d Container: Picture: python:alpine3.6 Command: [python, -c] - missing with a 66% probability args: [import random; Import system; exit_code = random.choice([0, 1, 1]); sys.exit(exit_code)] limit is the maximum number of retries of the container. retryPolicy indicates whether a container is repeated in the event of an error, an error, or both. Errors and errors are repeated again and again. Also available: OnFailure (default), OnError backoff is an exponential backoff that causes an empty retry strategy (i.e. retryStrategy: - provides) to cause a container to try again until it completes. Recursion templates can call each other recursively! In this variant of the above coin flip template, we continue to place coins until heads come. apiVersion: argoproj.io/v1alpha1 Type: Workflow metadata: generateName: coinflip-recursive- spec: entrypoint: coinflip templates: - name: coinflip steps: ' flip a coin - - name: flip-coin template: flip-coin ' evaluate the result in parallel - - name: heads template: heads -steps.flip-coin.outputs.outputs.result - Name: Tails , hold coins if tails template: coinflip if: -steps.flip-coin.outputs.outputs.result - Name: Flip-Coin Script: Image: python:alpine3.6 Command: [python] Source: | import random result = heads if random.randint(0,1) == 0 else tails print(result) - name: heads container: image: alpine:3.6 command: [sh, -c] args: [echo 'it was heads'] Here is the result of a few runs of coinflip for comparison. argo get coinflip-recursive-tzcb5 STEP PODNAME MESSAGE ✔ coinflip-recursive-vhph5 -✔ flip-coin coinflip-recursive-vhph5-212389039 ✔ ┬7 128690560 - Tails STEP PODNAME MESSAGE ✔ coinflip-recursive-tzcb5 - ✔ Flip-Coin Coinflip-recursive-tzcb5-322836820 , ┬ , heads, ✔ tails, ✔-flip-coin coinflip-recursive-tzcb5-1863890320 ,┬ , heads , ✔ tails, ✔ Flip-Coin Coin Recursive-tzcb5-1768147140, ┬, ✔ tails ✔ flip-coin-coin-recursive-tzcb5-4080411136 ┬,✔ heads coinflip-recursive-tzcb5-4080323273 - tails In the first pass the coin comes up immediately heads up and we stop. In the second round, the coin goes up three times before it finally appears and we stop. Exit Handler- An exit handler is a template that always runs at the end of the workflow, regardless of success or failure. Some common use cases of exit handlers are: Clean up after a workflow sends workflow status notifications (e.B. email/slack) by sending the pass/fail status to a webhook result (e..B GitHub build resubmitting or submitting another workflow apiVersion: argoproj.io/v1alpha1 Type: Workflow metadata: generateName: exit-handlers- spec: entrypoint: intentional-fail onExit: exit-handler - invoke exit-handler template at end of the workflow templates: ' primary workflow template - name: intentional-fail container: image: alpine:latest command: [sh, -c] Exit 1] - Exit Handler Templates - When the Entrypoint template is completed, the status of the Workflow workflow is exposed in the workflow.status global variable. Workflow.status becomes one of: Successful, Failed, Error - Name: Exit Handler Steps: - Name: notify Template: send-email - Name: celebrate Template: celebrate if: Workflow.status - Name: cry template: cry template: cry when: 'workflow.status''!= Succeeded - Name: send-email container: image: alpine:latest command: [sh, -c] args: [echo send e-mail: ''workflow.name'workflow.status'']] - Name: celebrate container: image: alpine:latest command: [sh, -c] args: [echo hooray!] - Name: Cry container: image: alpine:latest command: [sh, -c] args: [echo boohoo!] Timeouts. To limit the elapsed time for a workflow, you can set the activeDeadlineSeconds variable. To force a timeout for a container template, specify a value for activeDeadlineSeconds. apiVersion: argoproj.io/v1alpha1 Type: workflow metadata: generateName: timeouts- spec: entrypoint: sleep templates: - name: sleep container: image: alpine:latest command: [sh, -c] args: [echo sleeping for 1m; Sleep 60; echo done] activeDeadlineSeconds: 10 - Stop container template after 10 seconds of volumes. The following example dynamically creates a volume and then uses the volume in a two-step workflow. apiVersion: argoproj.io/v1alpha1 Type: Workflow metadata: generateName: volumes-pvc- spec: entrypoint: volumes-pvc-example volumeClaimTemplates: ' define volume, same syntax as k8s Pod spec - metadata: name: workdir ' name of volume claim spec: accessModes: [ReadWriteOnce] resources: requests: storage: 1Gi - Gi =&gt; 1024 * 1024 * 1024 Templates: - Name: volumes-pvc-Example steps: - - Name: Generate template: Walsay - - Name: Print template: Print message - Name: Walsay container: Image: docker/whalesay:latest command: [sh, -c] args: [Echo generating message in volume; Cowsay Hello World | tee /mnt/vol/hello_world.txt] - Mount workdir volume at /mnt/vol before invoking docker/whalesay volumeMounts: 'same syntax as k8s Pod spec - name: workdir mountPath: /mnt/vol - name: print-message container: image: alpine:latest command: [sh, -c] args: [echo getting message from volume; find /mnt/vol; cat /mnt/vol/hello_world.txt] - Mount workdir volume at /mnt/vol before invoking docker/whalesay volumeMounts: 'same syntax as k8s Pod spec - name: workdir mountPath: Volumes are a very useful way to move large large Data from one step in a workflow to another. Depending on the system, some volumes can be accessible in multiple steps at the same time. In some cases, you want to access an existing volume instead of dynamically creating/destroying it. • Define Kubernetes PVC art: PersistentVolumeClaim apiVersion: v1 metadata: name: my-existing-volume spec: accessModes: [ReadWriteOnce] resources: resources: requests: --- apiVersion: argoproj.io/v1alpha1 art: Workflow metadata: generateName: volumes-existing- spec: volume-existing-example-volumes: ' Pass my-existing-volume spec - Name: workdir persistentVolumeClaim: claimName: my-existing-volume templates: - name: volumes-existing-example steps: - - name: generate template: whalesay - - name: print-template: print-message - name: whalesay container: image: docker/whalesay:latest command: [sh, -c] args: [echo generating message in volume; Cowsay Hello World | tee /mnt/vol/hello_world.txt] volumeMounts: - name: workdir mountPath: /mnt/vol - name: print-message container: image: alpine:latest command: [sh, -c] args: [echo getting message from volume; find /mnt/vol; cat /mnt/vol/hello_world.txt] volumeMounts: - name: workdir mountPath: /mnt/vol It is also possible to declare existing volumes at the template level instead of the workflow level. These can be useful workflows that generate volumes using a resource step. apiVersion: argoproj.io/v1alpha1 Type: GenerateName: template-level-volume-spec: entrypoint: generate-and-use-volume-templates: - name: generate-and-use-volume steps: - - name: generate-volume template: generate-volume arguments: parameters: - name: pvc-size ' In a real example, this could be generated by a previous workflow step. value: '1Gi' - - name: generate template: whalesay arguments: parameters: - name: pvc-name value: ' - Name: Print template: print-message arguments: parameter: - Name: pvc-name value: ' apiVersion: v1 art: PersistentVolumeClaim metadata: generateName: pvc-example- spec: accessModes: ['ReadOnceWrite', 'ReadOnlyMany'] resources: requests: storage: ''inputs.parameters.pvc-size'' specifies: parameters: - name: pvc-name valueFrom: jsonPath: '.metadata.name'' - Name: Whalesay inputs: Parameter: - Name: pvc-name-Volumes: - name: workdir persistentClaimVolume: claimName: ''inputs.parameters.pvc-name'' Container: -c] args: [Echo generating message in volume; Cowsay Hello World | tee /mnt/vol/hello_world.txt] volumeMounts: - name: workdir mountPath: /mnt/vol - name: Inputs: Parameters: - Name: pvc-name volumes: - name: workdir persistentVolumeClaim: claimName: ''inputs.parameters.pvc-name'' container: image: alpine:latest command: [sh, -c] args: [echo getting message from volume; find /mnt/vol; cat /mnt/vol/hello_world.txt] volumeMounts: - name: workdir mountPath: /mnt/vol Suspending workflows can be paused by or by specifying a suspend step for the workflow: apiVersion: argoproj.io/v1alpha1 Type: Workflow metadata: generateName: suspend-template-spec: entrypoint: suspend template s - Name: Suspend Steps: - - name: build template: whalesay - - name: approve template: approve - - name: delay template: delay - - - name: release template: whalesay - name: approve suspend: ' - name: delay suspend: duration: 20 - Must be a string. Standard unit is seconds. Could also be a duration, e.B.: 2m, 6h, 1d - Name: Walsay container: Picture: docker/whalesay command: [cowsay] args: [hello world] Once exposed, a workflow does not plan any new steps until it is resumed. It can be automatically continued by Oder with a duration limit as described above. Argo workflows of daemon containers can start containers that run in the background (also known as daemon containers) while the workflow itself continues to run. Note that the daemons are automatically destroyed when the workflow leaves the template area where the daemon was called. Daemon containers are useful for commissioning services to be tested or used in tests (e.B devices). We also find it very useful when running large simulations to rotate a database as a daemon for collecting and organizing the results. The great advantage of demons compared to sidecars is that their existence can consist of several steps or even the entire workflow. apiVersion: argoproj.io/v1alpha1 Type: Workflow metadata: generateName: daemon-step- spec: entrypoint: daemon-example templates: - name: daemon-example steps: - name: influx template: influxdb ' start anadddb as a daemon (see the influxdb template spec below) - - name: init-database ' initialize influxdb template:://'steps.influx.ip':8086/query' --data-urlencode q=CREATE DATABASE mydb - - name: producer-1 ' add entries to influxdb template: influxdb-client arguments: parameters: - name: cmd value: for i in curl -XPOST 'http://'steps..ip':8086/write?db=mydb' -d cpu,host=$i sleep .5 ; done - name: producer-2 ' add entries to influxdb template: influxdb-client arguments: parameters: - name: cmd value: for i in (seq 1 20); do curl -XPOST 'http://'steps.influx.ip':8086/write?db=mydb' -d cpu,host=server02,region=uswest % 100)) ; schlafen .5 ; done - name: producer-3 - Add entries to influxdb template: influxdb-client arguments: arguments: - Name: cmd-Wert: curl -XPOST 'http://'steps.influx.ip':8086/write?db=mydb' -d 'cpu,host=server03,region=useast load=15.4' - - Name: Consumer - Verbrauchung von Influxdb-Vorlagen: influxdb-client-Argumente: Parameter: - Name: cmd-Wert: curl --silent -G http://'steps.influx.ip':8086/query?pretty=true --data-urlencode db=mydb --data-urlencode q=SELECT * FROM cpu - name: influxdb daemon: true influxdb als Daemon retryStrategy: limit: 10 ' retry container if it fails container: image: influxdb:1.2 readinessProbe: ' wait for readinessProbe to succeed httpGet: path: /ping port: 8086 - name: influxdb-client inputs: parameters: - name: cmd container: image: appropriate /curl:latest-Befehl: [/bin/sh, -c] args: [-inputs.parameters.cmd'']]-Ressourcen: Anforderungen: Speicher: 32Mi cpu: 100m Step-Vorlagen verwenden das Schrittpräfix, um auf einen anderen Schritt zu verweisen: z. B. steps.influx.ip. Dag templates use the task prefix instead: e.B. tasks.influx.ip. A sidecar is another container that runs simultaneously in the same pod as the main container and is useful when creating pods with multiple containers. apiVersion: argoproj.io/v1alpha1 Type: Workflow metadata: generateName: sidecar-nginx- spec: entrypoint: sidecar-nginx sample templates: - Name: sidecar-nginx-example container: image: appropriate/curl command: [sh, -c] ' Try to read from the nginx web server until it comes to the Args: [to 'curl -G' &gt;&amp; /tmp/out' echo Sleep &amp;&amp; Sleep 1; done &amp;&amp; cat /tmp/out] - Create a simple nginx web server sidecars: - Name: nginx Image: nginx:1.13 In the example above, we'll create a sidecar container that runs nginx as a simple web server. The order in which containers are displayed is random, so in this example, the main container queries the nginx container until it is ready for request inge. This is a good design pattern when designing systems with multiple containers: always wait for all the services you need to run the main code. With Argo, you can use any container image you want to create. In practice, however, we find that certain types of artifacts are very common, so there is built-in support for Git, http, gcs, and s3 artifacts. apiVersion: argoproj.io/v1alpha1 Type: Workflow metadata: generateName: hardwired-artifact-spec: entrypoint: hardwired-artifact templates: - name: hardwired-artifact inputs: ' Check out the master branch of the argo repo and place it at /src ' revision can be anything that git check acceptouts: branch, commit, tag, etc. - name: argo-source path: /src git: repo: revision: master - Download kubectl 1.8.0 and set it to /bin/kubectl - Name: kubectl path: mode: 0755 http: url: repository bucket (such as AWS, GCS and Minio) and place it under /s3 - Name: Object path: /s3 s3: Endpoint: storage.googleapis.com bucket: my-bucket-name key: path/in/bucket accessKeySecret: name: my-s3-credentials key: accessKey secretKeySecret: name: my-s3-credentials key: secretKey container: -c] args: [ls -l /src /bin/kubectl /s3] Kubernetes Resources. In many cases, you should manage Kubernetes resources through Argo workflows. You can use the resource template to create, delete, or update any type of Kubernetes resource. • in a workflow. The resource template type accepts all k8s manifests (including CRDs) and can perform any kubectl action against them (e.B. create, apply, delete, patch). apiVersion: argoproj.io/v1alpha1 Type: Workflow Metadata: generateName: k8s-jobs- spec: entrypoint: pi-tmpl templates: - name: pi-tmpl resource: ' indicates that it is a resource template action: create - can be any kubectl action (e.B. create, delete, apply, patch) - The successCondition and failure If failureCondition is true, the step is considered failed. If successCondition is true, the step is considered successful. They use the kubernetes label selection syntax and can be applied to any field in the resource (not just labels). Multiple AND conditions can be represented by comma expressions. For more details: successCondition: status.succeeded &gt; 0 failureCondition: status.failed &gt; 3 manifest: | #put your kubernetes spec here apiVersion: batch/v1 art: Job metadata: generateName: pi-job- spec: template: metadata: name: pi spec: containers: - name: pi image: perl command: [perl, -Mbignum=bpi, -wle, print bpi(2000)] restartPolicy: Never backoffLimit: 4 Resources created in this way are independent of the workflow. If you want the resource to be deleted when the workflow is deleted, you can use Kubernetes garbage collection with the workflow resource as the owner reference (example). Note: When patching, the resource accepts another attribute, mergeStrategy, which can be either strategic, merged, or json. If this attribute is omitted, it is used strategically by default. Note that custom resources cannot be patched with strategic patches, so a different strategy must be chosen. Suppose you have defined the CronTab CustomResourceDefinition, and the following instance of a CronTab: apiVersion: stable.example.com/v1 Type: CronTab spec: cronSpec: * */5 Image: my-awesome-cron-image This crontab can be used with the following Argo workflow werden: apiVersion: argoproj.io/v1alpha1 Art: Workflow-Metadaten: generateName: k8s-patch- spec: entrypoint: cront-tmpl templates: - name: cront-tmpl resource: action: patch mergeStrategy: merge - Must be one of [strategic merge merge Manifesto: | apiVersion: stable.example.com/v1 Type: CronTab spec: cronSpec: * * * * */10 Image: my-awesome-cron-image An application of Sidecars is to implement Docker-in-Docker (DinD). DinD is useful when you want to run Docker commands from a container. For example.B you can create and move a container image from the container. In the following example, we use containerdocker:dind to run a Docker daemon in a sidecar and grant the main container access to the daemon. apiVersion: argoproj.io/v1alpha1 Type: Workflow Metadata: generateName: sidecar-dind- spec: entrypoint: dind-sidecar-example templates: - name: dind-sidecar-example container: image: docker:19.03.13 command: [sh, -c] args: [until docker ps; sleep 3; done; docker run --rm debian:latest cat /etc/os-release] env: - name: DOCKER_HOST - the docker daemon can access the default port on localhost value: 127.0.0.1 Sidecars: - Name: dind image: docker:19.03.13-dind ' Docker provides already an image to run a Docker daemon env: - Name: DOCKER_TLS_CERTDIR - Docker TLS env config value: securityContext: privileged: true - the Docker daemon can only run in a privileged container. - mirrorVolumeMounts mounts the same volumes specified in the main container, on the sidecar (including artifacts), on the same mountPaths. This will allow the Dind daemon (partially) to see the same file system as the main container in - to use features such as the Docker volume binding. mirrorVolumeMounts: true Custom Template Variable Reference. In this example, we can see how we can use the other template language variable reference (e.B Jinja) in the Argo workflow template. Argo validates and resolves only the variable that begins with the allowed Argo prefix item, steps, inputs, outputs, tasks, tasks. apiVersion: argoproj.io/v1alpha1 Type: Workflow metadata: generateName: custom-template-variable- spec: entrypoint: hello-hello-hello templates: - name: hello-hello-hello steps: - - name: hello1 template: value: hello1]- - name: hello2a template: whalesay arguments: parameters: ['name: message, value: hello2a'] - name: hello2b template: whalesay arguments: parameters: ['name: message, value: hello2b]- - Name: Whalesay inputs: Parameter: - Name: Message container: Image: docker/whalesay command: [cowsay] args: [-user.user.username]] Continuous Integration Example. Continuous integration is a popular application for workflows. Currently, Argo does not provide event triggers for automatically starting your CI jobs, but we plan to do so in the near future. Until then, you can easily write a cron job that searches for new commits and starts the required workflow, or use your existing Jenkins server to complete the workflow. For a good example of a CI workflow specification, see Since it only uses the concepts that we have already covered and is a bit long, we do not go into detail here. Here.

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