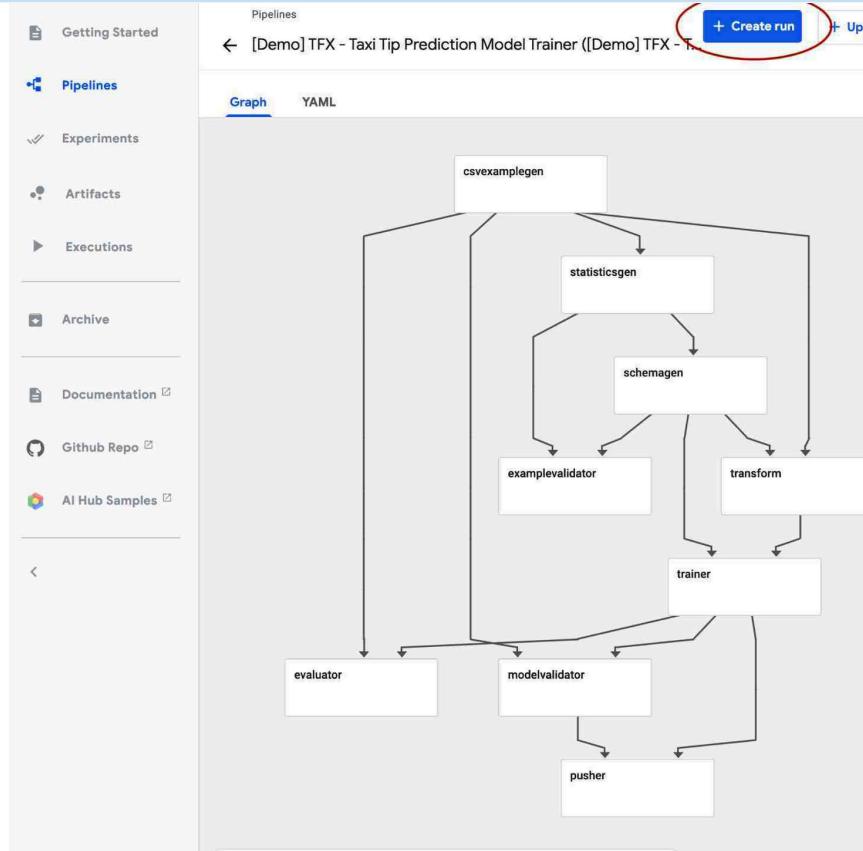
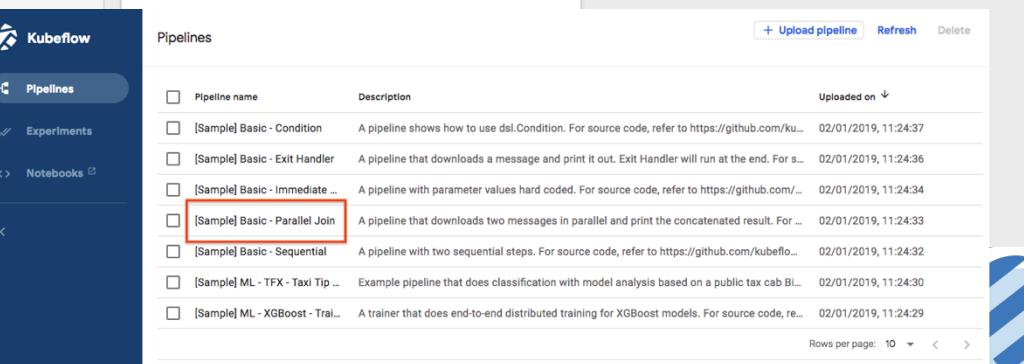


Kubeflow Pipelines

- Containerized implementations of ML Tasks
 - Pre-built components: Just provide params or code snippets (e.g. training code)
 - Create your own components from code or libraries
 - Use any runtime, framework, data types
 - Attach k8s objects - volumes, secrets
- Specification of the sequence of steps
 - Specified via Python DSL
 - Inferred from data dependencies on input/output
- Input Parameters
 - A “Run” = Pipeline invoked w/ specific parameters
 - Can be cloned with different parameters
- Schedules
 - Invoke a single run or create a recurring scheduled pipeline



The graph view displays a pipeline named "csvexamplegen". The flow starts with "statisticsgen", which feeds into "schemagen". "schemagen" then branches into "examplevalidator" and "transform". "examplevalidator" and "transform" both feed into "trainer". "trainer" then feeds into "evaluator" and "modelvalidator". Finally, "evaluator" and "modelvalidator" both feed into "pusher".

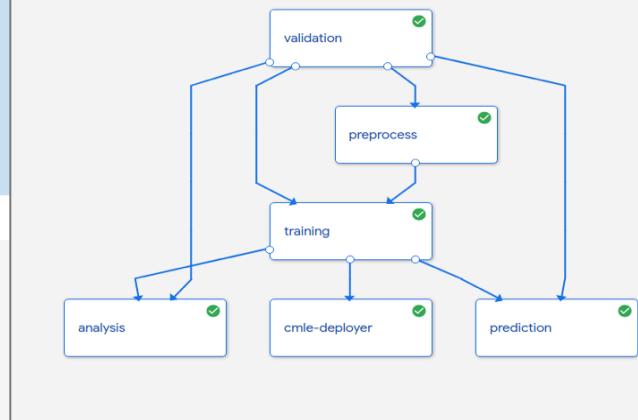


Pipeline name	Description	Uploaded on
[Sample] Basic - Condition	A pipeline shows how to use dsl.Condition. For source code, refer to https://github.com/ku...	02/01/2019, 11:24:37
[Sample] Basic - Exit Handler	A pipeline that downloads a message and print it out. Exit Handler will run at the end. For ...	02/01/2019, 11:24:36
[Sample] Basic - Immediate ...	A pipeline with parameter values hard coded. For source code, refer to https://github.com/...	02/01/2019, 11:24:34
[Sample] Basic - Parallel Join	A pipeline that downloads two messages in parallel and print the concatenated result. For ...	02/01/2019, 11:24:33
[Sample] Basic - Sequential	A pipeline with two sequential steps. For source code, refer to https://github.com/kubeflo...	02/01/2019, 11:24:32
[Sample] ML - TFX - Taxi Tip ...	Example pipeline that does classification with model analysis based on a public tax cab Bl...	02/01/2019, 11:24:30
[Sample] ML - XGBoost - Trai...	A trainer that does end-to-end distributed training for XGBoost models. For source code, re...	02/01/2019, 11:24:29

Define Pipeline with Python SDK

```
@dsl.pipeline(name='Taxi Cab Classification Pipeline Example')
def taxi_cab_classification(
    output_dir,
    project,
    Train_data      = 'gs://bucket/train.csv',
    Evaluation_data = 'gs://bucket/eval.csv',
    Target          = 'tips',
    Learning_rate   = 0.1, hidden_layer_size = '100,50', steps=3000):

    tfdv           = TfdvOp(train_data, evaluation_data, project, output_dir)
    preprocess     = PreprocessOp(train_data, evaluation_data, tfdv.output["schema"], project, output_dir)
    training       = DnnTrainerOp(preprocess.output, tfdv.schema, learning_rate, hidden_layer_size, steps,
                                target, output_dir)
    tfma           = TfmaOp(training.output, evaluation_data, tfdv.schema, project, output_dir)
    deploy         = TfServingDeployerOp(training.output)
```



Compile and Submit Pipeline Run

```
dsl.compile(taxi_cab_classification, 'tfx.tar.gz')
run = client.run_pipeline(
    'tfx_run', 'tfx.tar.gz', params={'output': 'gs://dpa22', 'project': 'my-project-33'})
```



Visualize the state of various components

Pipelines
Experiments
Artifacts
Executions
Archive
Documentation
Github Repo
AI Hub Samples

Cluster name: cluster-4
Build commit: 743746b
Report an Issue

Graph Run output Config

csvexamplegen → statisticsgen → schemagen → examplevalidator → evaluator → pusher

resolvernode-lates... → evaluator

Static HTML

Sort by Feature ▾ Reverse order Feature search (...)

Features: int(8) float(7) string(2)
 unknown(1)

Numeric Features (15)			
count	missing	mean	std dev
dropoff_census_tract 3,618	28.93%	17.0B	333k
dropoff_community_area 4,905	3.65%	21.2	17.85
dropoff_latitude 4,915	3.46%	41.9	0.04
dropoff_longitude 4,915	3.46%	-87.65	0.06

Runtime execution graph. Only steps that are currently running or have a

Pipelines versioning

Pipelines

[+ Upload pipeline](#)[Refresh](#)[Delete](#)

Filter pipelines

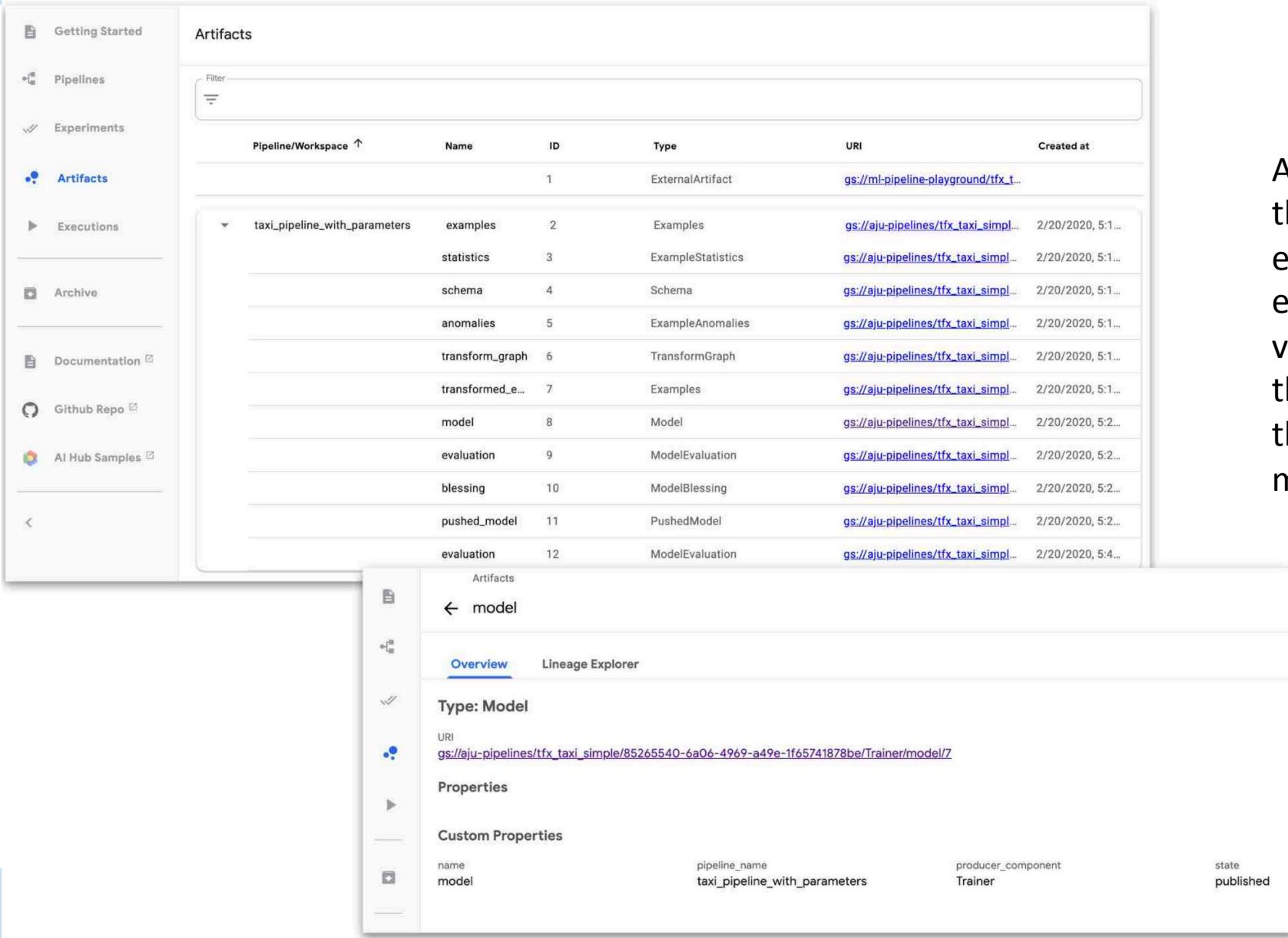


<input type="checkbox"/>	Pipeline name	Description	Uploaded on
<input type="checkbox"/>	[Tutorial] DSL - Control structures	source code Shows how to use conditional execution and exit handlers. This pipeline will randomly fail to demonstra...	2/20/2020, 3:28:12 PM
<input type="checkbox"/>	[Tutorial] Data passing in python com...	source code Shows how to pass data between python components.	2/20/2020, 3:28:11 PM
<input type="checkbox"/>	[Demo] TFX - Taxi Tip Prediction Mod...	source code GCP Permission requirements . Example pipeline that does classification with model analysis based on ...	2/20/2020, 3:28:10 PM
<input type="checkbox"/>	Version name		Uploaded on
<input type="checkbox"/>	TFX - Taxi Tip Prediction Model Trainer_version_at_2020-03-03T15:44:30.197Z		3/3/2020, 7:55:03 AM
<input type="checkbox"/>	[Demo] TFX - Taxi Tip Prediction Model Trainer		2/20/2020, 3:28:10 PM
			Rows per page: 10 < >
<input type="checkbox"/>	[Demo] XGBoost - Training with Confu...	source code GCP Permission requirements . A trainer that does end-to-end distributed training for XGBoost models.	2/20/2020, 3:28:09 PM
			Rows per page: 10 < >

Pipelines lets you group and manage multiple versions of a pipeline.



Artifact Tracking



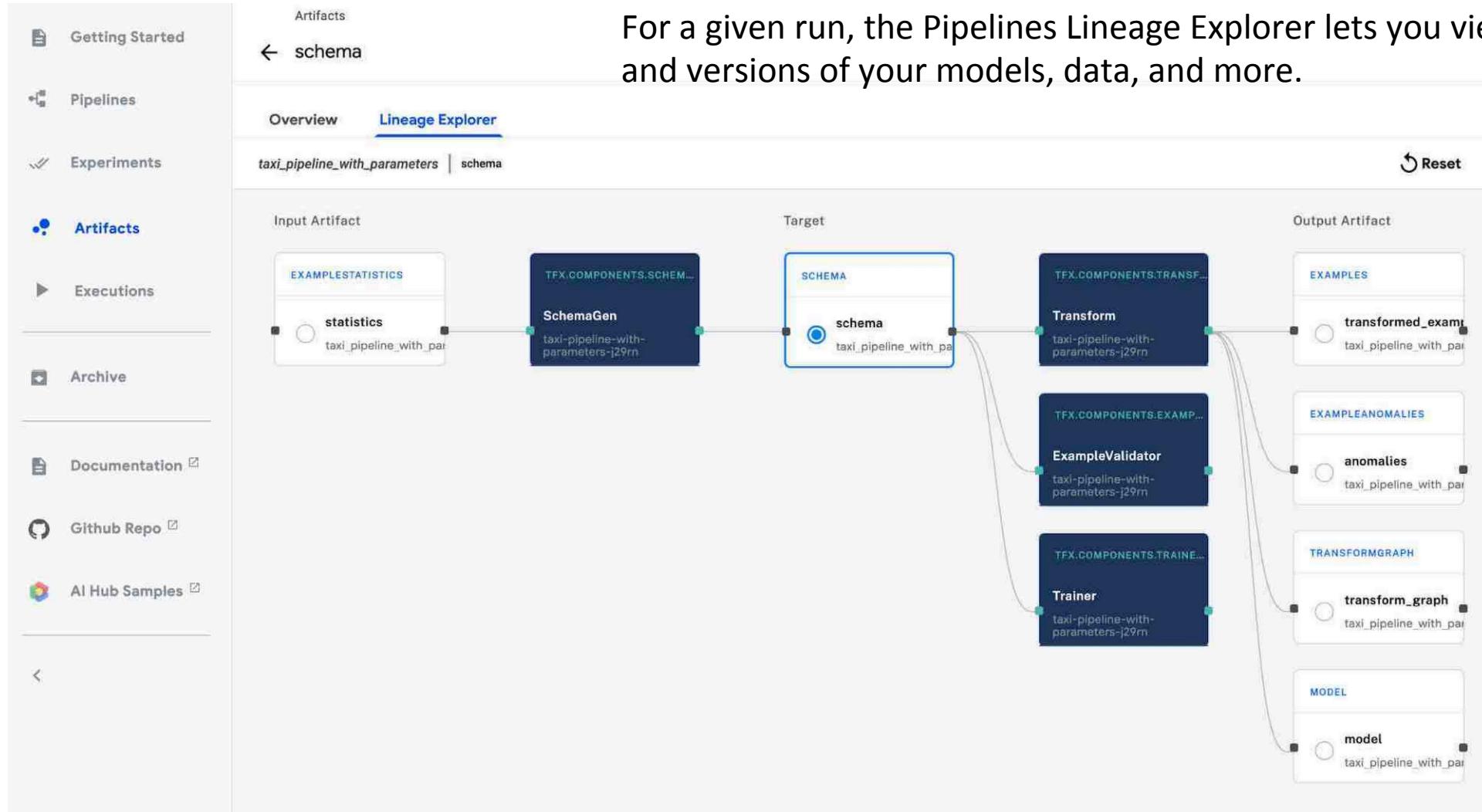
The screenshot shows the KubeFlow interface for artifact tracking. On the left, a sidebar navigation includes: Getting Started, Pipelines, Experiments, Artifacts (selected), Executions, Archive, Documentation, Github Repo, and AI Hub Samples. The main area is titled "Artifacts" and displays a table of artifacts from the "taxi_pipeline_with_parameters" pipeline. The table columns are: Pipeline/Workspace, Name, ID, Type, URI, and Created at. The data is as follows:

Pipeline/Workspace	Name	ID	Type	URI	Created at
		1	ExternalArtifact	gs://ml-pipeline-playground/tfx_t...	
taxi_pipeline_with_parameters	examples	2	Examples	gs://aju-pipelines/tfx_taxi_simpl...	2/20/2020, 5:1...
	statistics	3	ExampleStatistics	gs://aju-pipelines/tfx_taxi_simpl...	2/20/2020, 5:1...
	schema	4	Schema	gs://aju-pipelines/tfx_taxi_simpl...	2/20/2020, 5:1...
	anomalies	5	ExampleAnomalies	gs://aju-pipelines/tfx_taxi_simpl...	2/20/2020, 5:1...
	transform_graph	6	TransformGraph	gs://aju-pipelines/tfx_taxi_simpl...	2/20/2020, 5:1...
	transformed_e...	7	Examples	gs://aju-pipelines/tfx_taxi_simpl...	2/20/2020, 5:1...
	model	8	Model	gs://aju-pipelines/tfx_taxi_simpl...	2/20/2020, 5:2...
	evaluation	9	ModelEvaluation	gs://aju-pipelines/tfx_taxi_simpl...	2/20/2020, 5:2...
	blessing	10	ModelBlessing	gs://aju-pipelines/tfx_taxi_simpl...	2/20/2020, 5:2...
	pushed_model	11	PushedModel	gs://aju-pipelines/tfx_taxi_simpl...	2/20/2020, 5:2...
	evaluation	12	ModelEvaluation	gs://aju-pipelines/tfx_taxi_simpl...	2/20/2020, 5:4...

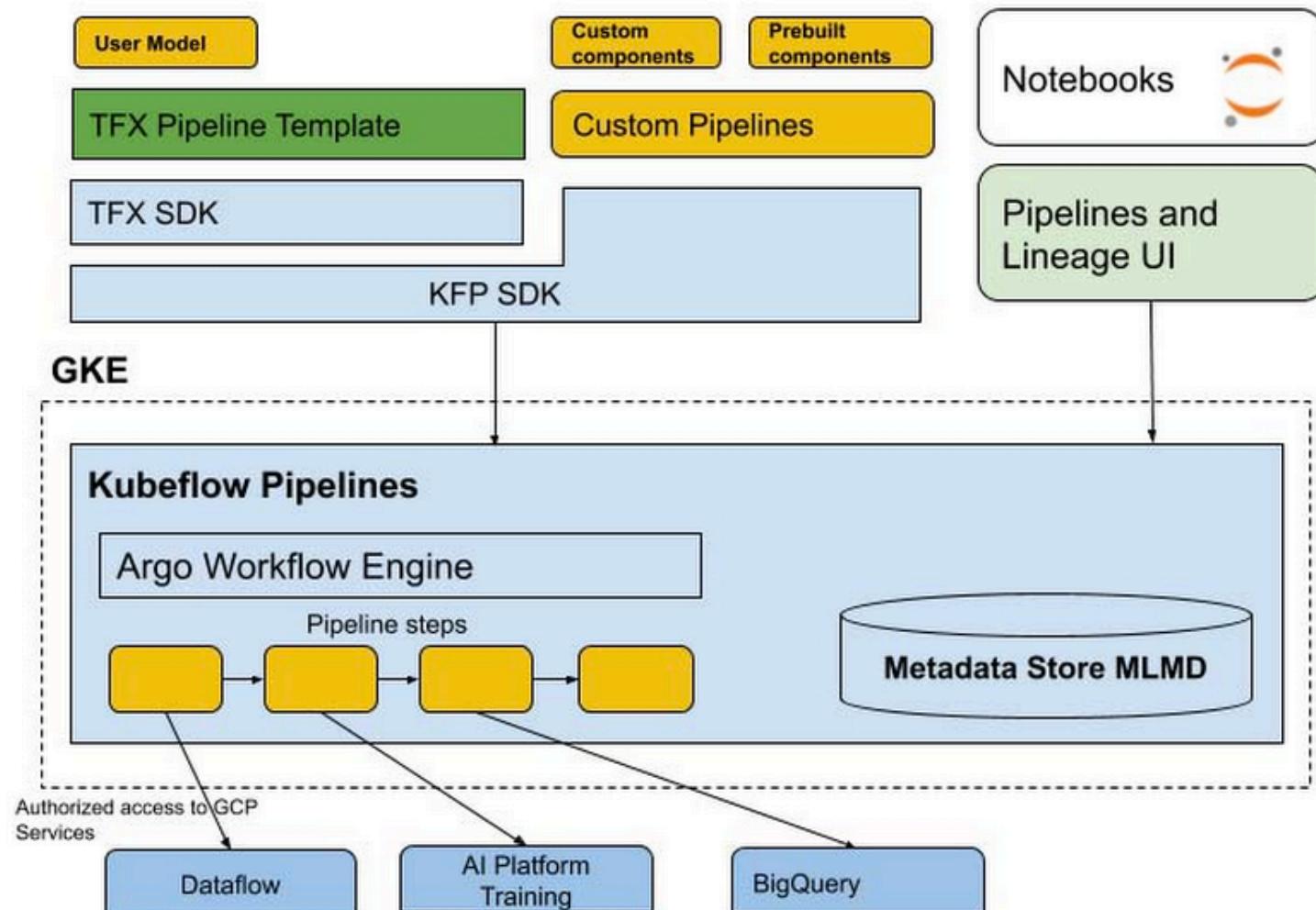
Below the table, a detailed view for the "model" artifact is shown. It includes tabs for Overview (selected) and Lineage Explorer, a Type section (Model), a URI (gs://aju-pipelines/tfx_taxi_simple/85265540-6a06-4969-a49e-1f65741878be/Trainer/model/7), and sections for Properties and Custom Properties.

Artifacts for a run of the “TFX Taxi Trip” example pipeline. For each artifact, you can view details and get the artifact URL—in this case, for the model.

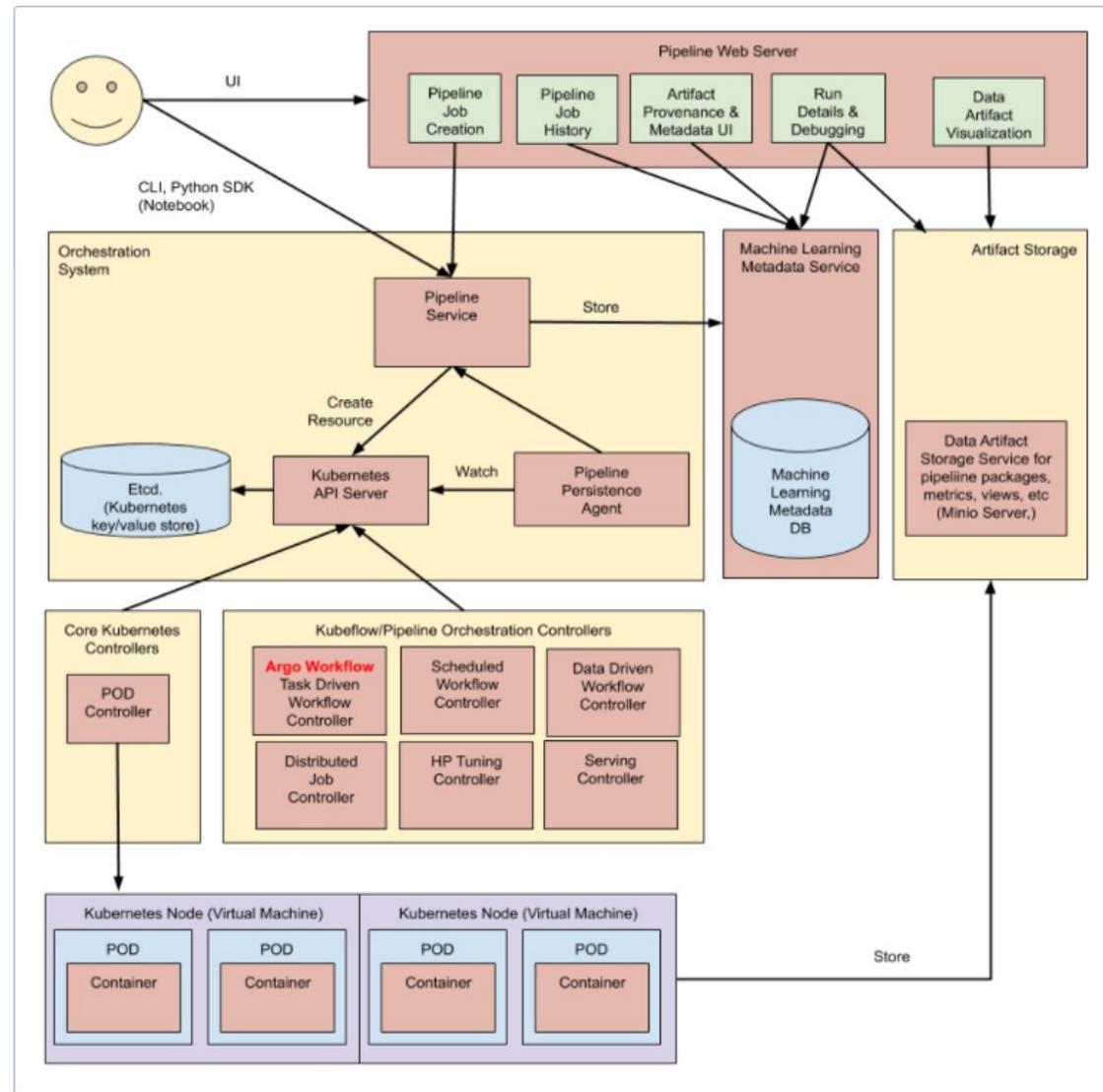
Lineage Tracking



Kubeflow Pipeline Architecture



Kubeflow Pipeline Architecture



Goals

- Demonstrate that Watson can be used for end-end AI lifecycle data prep/model training/model risk validation/model deployment/monitoring/updating models
- Demonstrate that the full lifecycle can be operated programmatically, and have **Tekton** as a backend instead of Argo

Kubeflow Pipeline interface showing the execution graph and logs for an experiment.

Execution Graph:

```

graph TD
    A[create-secret-with...] --> B[download-data-a...]
    A --> C[data-refinery]
    A --> D[dart-toolkit]
    B --> E[biased-data-split]
    C --> E
    D --> E
    E --> F[auto-ai-op]
    F --> G[deploy-model-to...]
    G --> H[mrm-check-in-openscale]
    H --> I[mrm-check-in-op...]
    I --> J[upload-data-assem...]
    I --> K[upload-data-assem...]
    J --> L[upload-data-assem...]
    K --> L
    L --> M[create-secret-with...]
  
```

Logs:

```

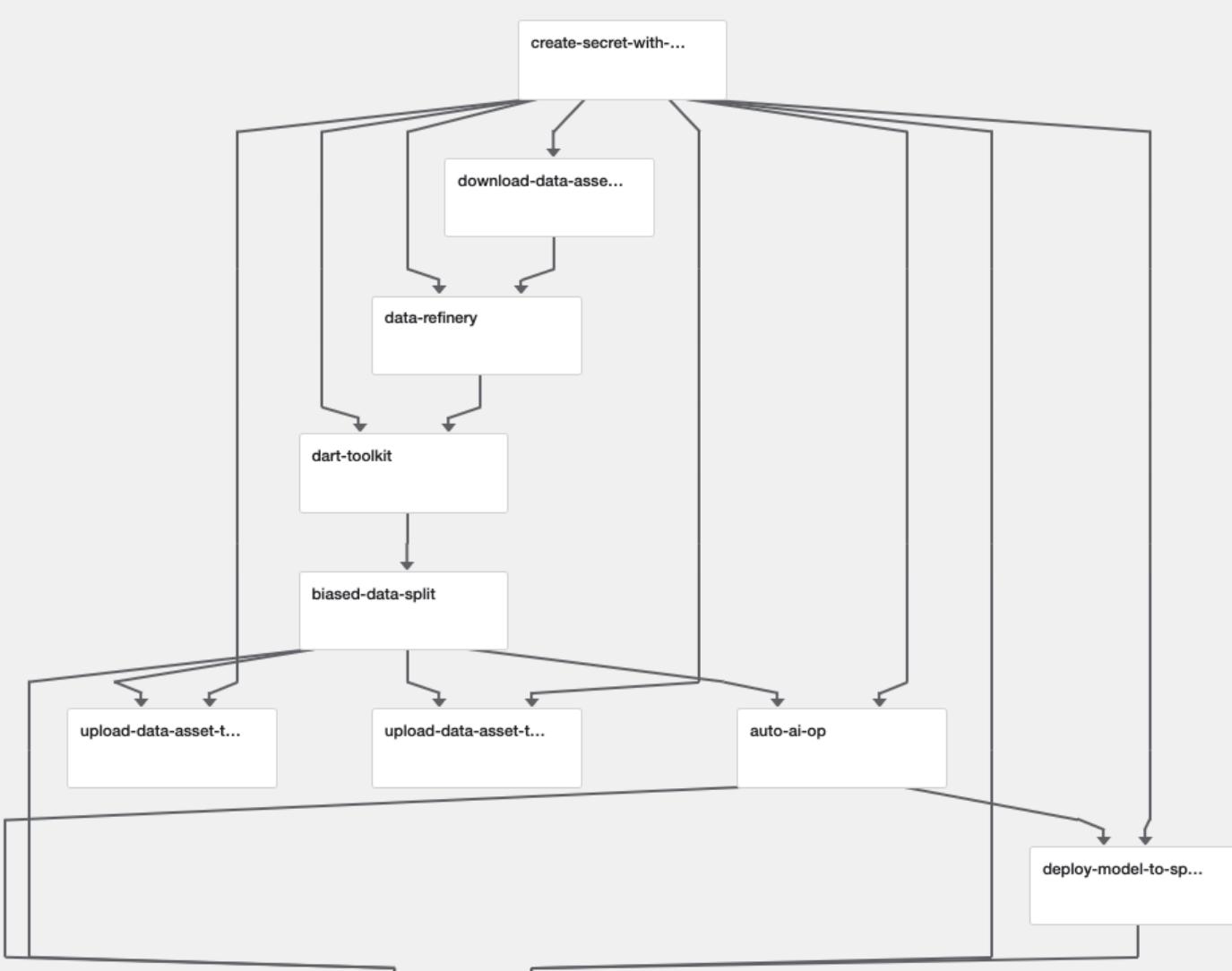
train-the-model-and-monitor-with-openscale-pjpr-2081484978
19 Requirement already satisfied: numpy in /opt/app-root/lib/python3.6/site-packages (from tensorflow<2.0.0,>=1.13.3) (1.13.3)
20 Requirement already satisfied: joblib==0.11 in /opt/app-root/lib/python3.6/site-packages (from tensorflow<2.0.0,>=1.13.3) (0.11)
21 Requirement already satisfied: python-dateutil>=2.2 in /opt/app-root/lib/python3.6/site-packages (from tensorflow<2.0.0,>=1.13.3) (2.2)
22 Requirement already satisfied: six>=1.8.0 in /opt/app-root/lib/python3.6/site-packages (from tensorflow<2.0.0,>=1.13.3) (1.13.3)
23 Requirement already satisfied: tensorflow<2.0.0,>=1.13.3 in /opt/app-root/lib/python3.6/site-packages (from tensorflow<2.0.0,>=1.13.3) (1.13.3)
24 Requirement already satisfied: pytz in /opt/app-root/lib/python3.6/site-packages (from tensorflow<2.0.0,>=1.13.3) (2018.7)
25 Requirement already satisfied: cycler>=0.10 in /opt/app-root/lib/python3.6/site-packages (from tensorflow<2.0.0,>=1.13.3) (0.10.0)
26 Requirement already satisfied: astor>=0.5.2 in /opt/app-root/lib/python3.6/site-packages (from tensorflow<2.0.0,>=1.13.3) (0.5.2)
27 Requirement already satisfied: networkx>=2.0 in /opt/app-root/lib/python3.6/site-packages (from tensorflow<2.0.0,>=1.13.3) (2.0)
28 Requirement already satisfied: pillow>=4.3.0 in /opt/app-root/lib/python3.6/site-packages (from tensorflow<2.0.0,>=1.13.3) (4.3.0)
29 Requirement already satisfied: imageio>=2.3.0 in /opt/app-root/lib/python3.6/site-packages (from tensorflow<2.0.0,>=1.13.3) (2.3.0)
30 Requirement already satisfied: decorator>=4.3.0 in /opt/app-root/lib/python3.6/site-packages (from tensorflow<2.0.0,>=1.13.3) (4.3.0)
31 drifter
32 enablement finished.
33 running mrm...
34 triggered mrm...
35 running mrm...
36 running mrm...
37 Done triggering MRM computation with mrm_monitor...
38 10:48:05 upload_in_progress
39 10:48:19 upload_in_progress
40 10:48:31 upload_in_progress
41 10:48:31 upload_in_progress

46 running upload and evaluate for validation_test
47 10:48:56 upload_in_progress
48 10:49:12 running
49 10:49:12 running
50 10:49:12 finished
51 10:49:55 finished
52 running upload and evaluate for validation_test
53 10:49:59 upload_in_progress
54 10:49:59 upload_in_progress
55 10:49:59 running
56 10:49:59 finished
57 10:49:59 upload_in_progress
58 10:49:59 upload_in_progress
59 10:49:59 upload_in_progress
60 10:49:59 upload_in_progress
61 10:49:59 upload_in_progress
62 10:49:59 upload_in_progress
63 10:49:59 upload_in_progress
64 10:49:59 running
65 10:49:59 finished
66 10:49:59 upload_in_progress
67 running upload and evaluate for validation_test
68 10:49:59 upload_in_progress
69 10:49:59 upload_in_progress
70 10:49:59 upload_in_progress
71 10:49:59 upload_in_progress
72 10:49:59 upload_in_progress
73 10:49:59 running
74 10:49:59 running
75 10:49:59 finished
76
  
```

Relationship map:

Pipeline leaderboard:

Rank	Name	Algorithm	Accuracy (Optimized)	Enhancements	Build time
1	Pipeline 4	Gradient Boosting Classifier	0.807	HPO-1 FE HPO-2	00:01:48
2	Pipeline 3	Gradient Boosting Classifier	0.804	HPO-1 FE	00:04:19
3	Pipeline 2	Gradient Boosting Classifier	0.804	HPO-1	00:00:38
4	Pipeline 1	Gradient Boosting Classifier	0.802	None	00:00:07



Run details

Pipeline*

Train the model and monitor with OpenScale

[Choose](#)

Pipeline Version*

Train the model and monitor with OpenScale

[Choose](#)

Run name*

Run of Train the model and monitor with OpenScale (a28a6)

Description (optional)

This run will be associated with the following experiment

Experiment*

GCR-AutoAI-Experiment-1

[Choose](#)

Run Type

 One-off Recurring

Run parameters

Specify parameters required by the pipeline

github_token

6fd86cff0394892e772cd84d43a9e2d7546b1576

ai_config_url

https://raw.githubusercontent.com/IBM-Lifecycle-Poland/kubeflow-pipelines-credentials/master/config_cpd

catalog_name

DataCatalog

asset_id

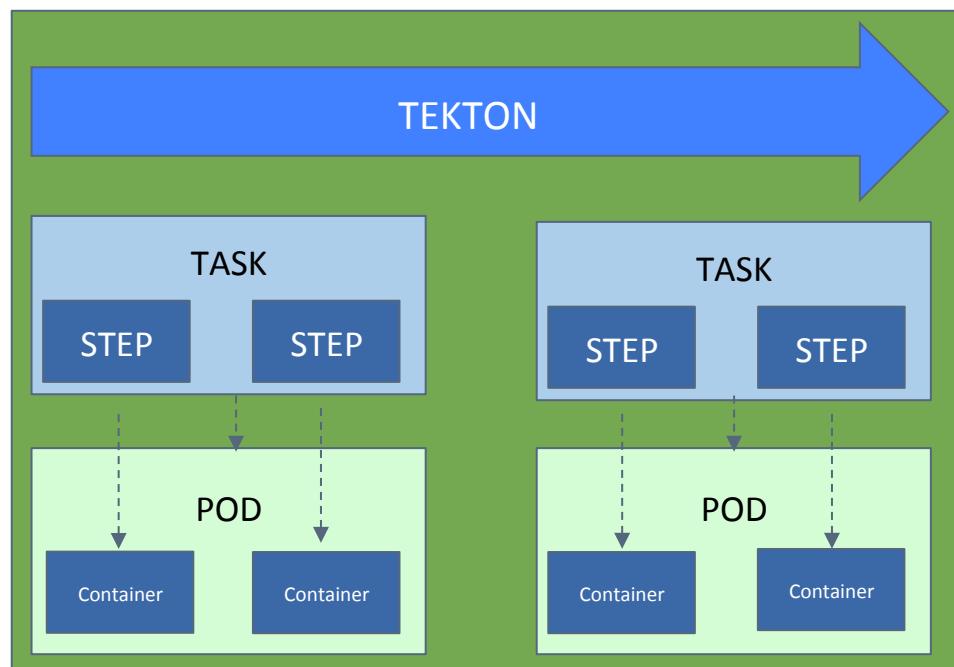
2737bafc-3f78-4e2d-850a-e7f352b3d6b8

pre_production_space_uid

1dd2aaec-781a-4712-a7ff-ae1862cf7a84

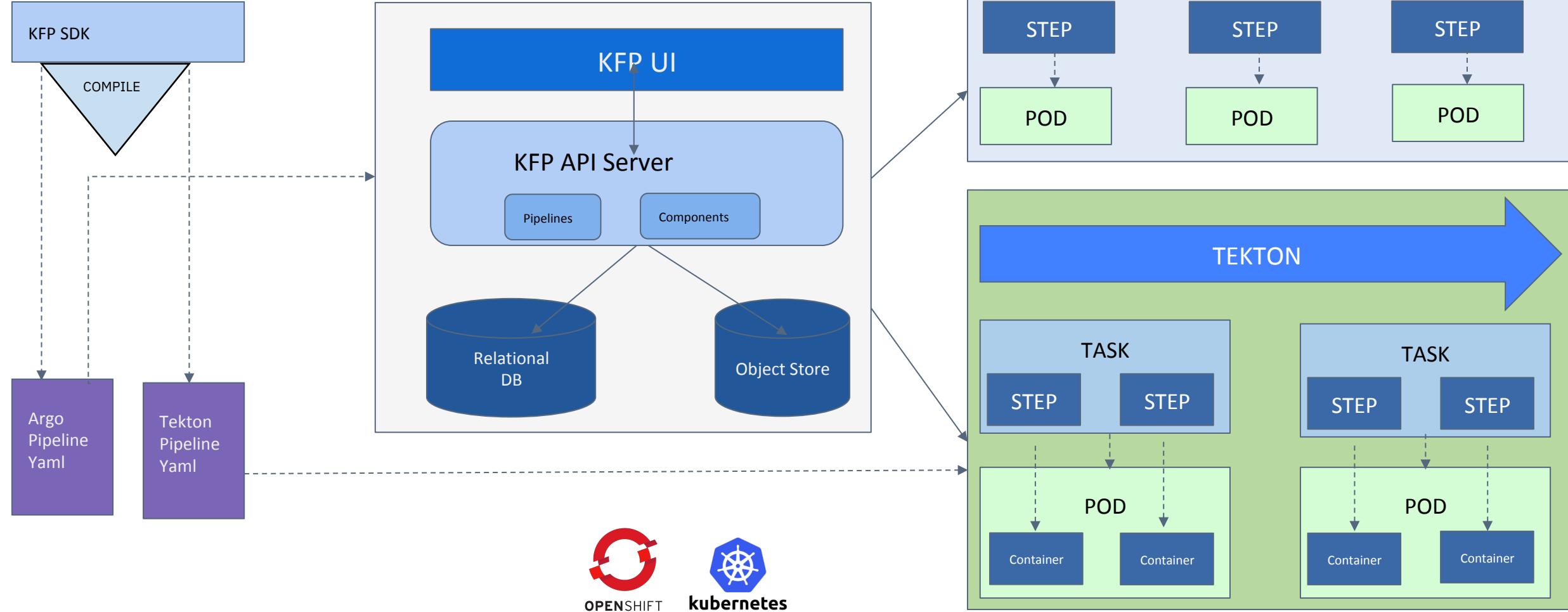
Tekton

- The Tekton Pipelines project provides Kubernetes-style resources for declaring CI/CD-style pipelines.
- Tekton introduces several new CRDs including Task, Pipeline, TaskRun, and PipelineRun.
- A PipelineRun represents a single running instance of a Pipeline and is responsible for creating a Pod for each of its Tasks and as many containers within each Pod as it has Steps.



- A **PipelineResource** defines an object that is an input (such as a git repository) or an output (such as a docker image) of the pipeline.
- A **PipelineRun** defines an execution of a pipeline. It references the Pipeline to run and the PipelineResources to use as inputs and outputs.
- A **Pipeline** defines the set of Tasks that compose a pipeline.
- A **Task** defines a set of build Steps such as compiling code, running tests, and building and deploying images.

KFP – Tekton Phase One



Pluggable Components

Spark

Watson Studio

WML

Open Scale

Kubeflow Training

Seldon

AIF360

ART

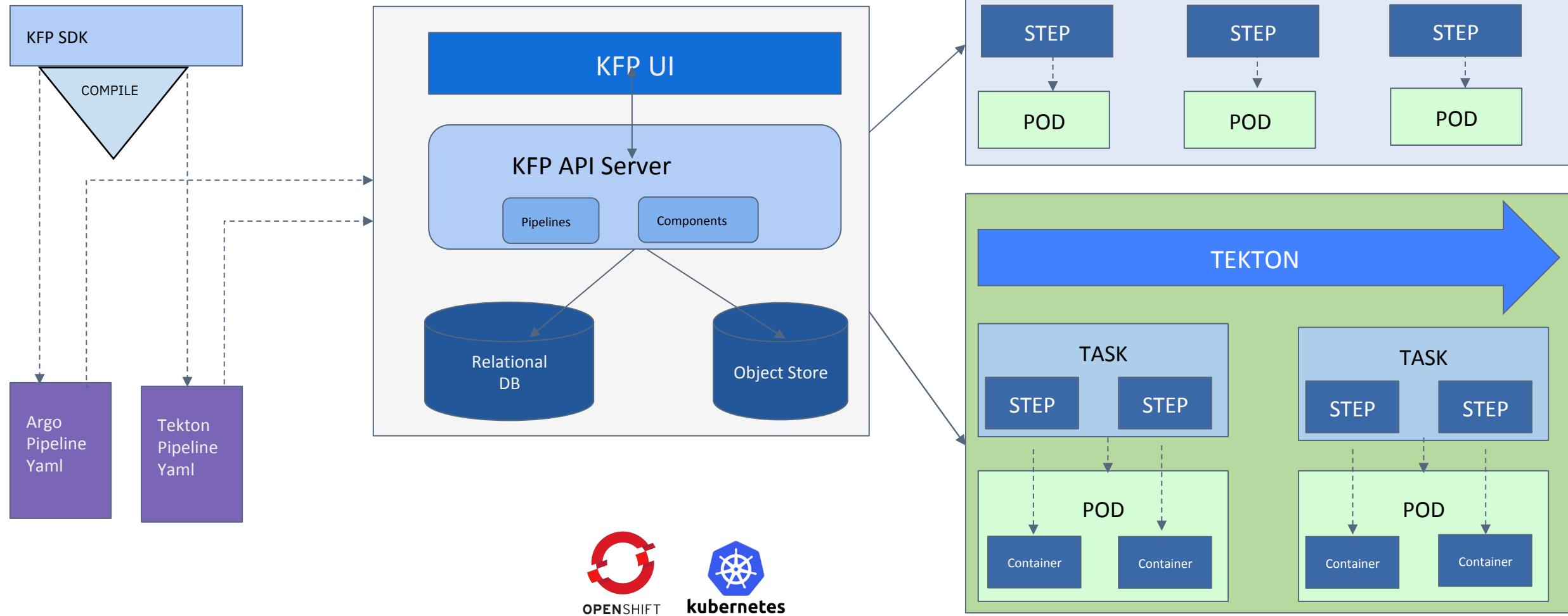
KATIB

KFSERVING

...



KFP – Tekton Phase Two



OPENSHIFT



kubernetes

Pluggable Components



Spark

Watson Studio

WML

Open Scale

Kubeflow Training

Seldon

AIF360

ART

KATIB

KFSERVING

...



DSL features implemented

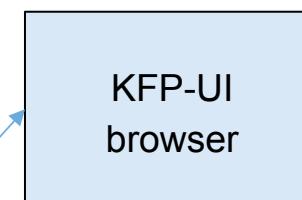
- Pipeline DSL features with native Tekton implementation
 - pod_annotations and pod_labels
 - Retries
 - Volumes
 - Timeout for Tasks and Pipelines
 - RunAfter
 - Input Parameters
 - ContainerOp
 - Affinity, Node Selector, and Tolerations
- Pipeline DSL features with custom Tekton implementation
 - Features with same behavior as Argo
 - InitContainers
 - Conditions
 - ResourceOp, VolumeOp, and VolumeSnapshotOp
 - Output Parameters
 - Input Artifacts
 - Output Artifacts
 - Features with limitations
 - ParallelFor - Tracking issue
 - Variable Substitutions - Tracking issue
 - ImagePullSecrets - Tracking issue
 - Features with different behavior than Argo
 - Sidecars - Tracking issue
- Pipeline features that are unavailable on Tekton
 - Exit Handler - Tracking PR

Pipeline samples we are running

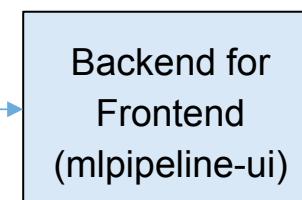
- MNIST End to End example with Kubeflow components
- Hyperparameter tuning using Katib
- Trusted AI Pipeline with AI Fairness 360 and Adversarial Robustness 360 components
- Training and Serving Models with Watson Machine Learning
- Lightweight python components example
- The flip-coin pipeline
- Nested pipeline example

[https://github.com/kubeflow/kfp-tekton/blob/master/samples/
README.md](https://github.com/kubeflow/kfp-tekton/blob/master/samples/README.md)

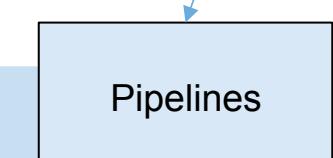
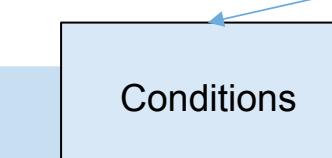
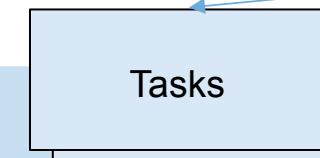
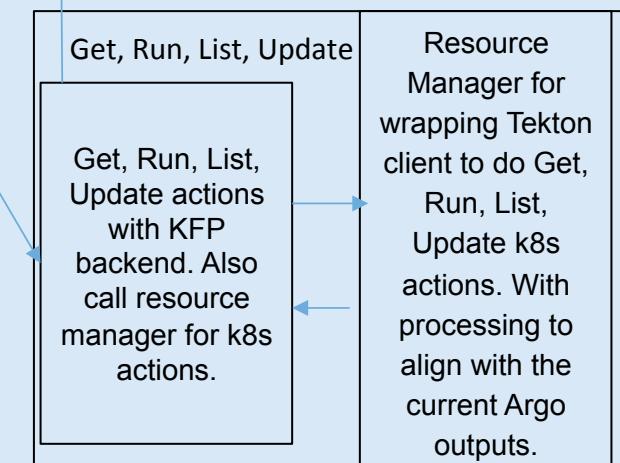
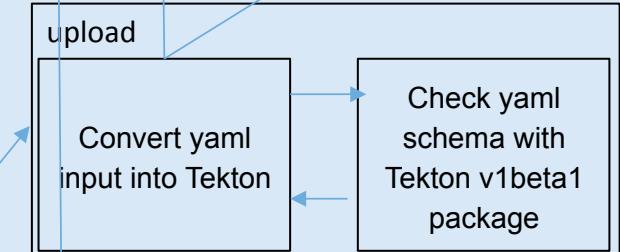
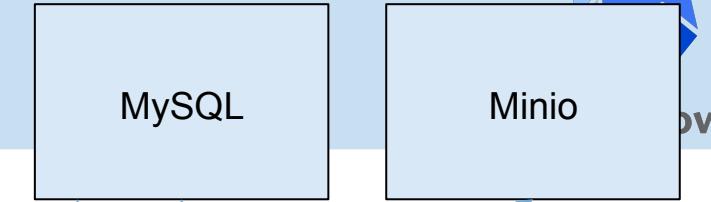
Local Machine



Server Machine



KFP API and backend





```
In [12]: kfp.Client(host="169.62.93.163").run_pipeline(experiment_id="74f7f363-96f8-487e-8632-4980b0971c7a",
                                                    job_name="sample-job",
                                                    pipeline_id="e684bc9e-cb30-4a3e-88f7-5c768202e6b7")
```

Run link [here](#)

```
Out[12]: {'created_at': datetime.datetime(2020, 5, 22, 0, 7, 46, tzinfo=tzutc()),
           'description': None,
           'error': None,
           'finished_at': datetime.datetime(1970, 1, 1, 0, 0, tzinfo=tzutc()),
           'id': '752ed34b-4ade-4654-b7d7-829618edd530',
           'metrics': None,
           'name': 'sample-job',
           'pipeline_spec': {'parameters': None,
                             'pipeline_id': 'e684bc9e-cb30-4a3e-88f7-5c768202e6b7',
                             'pipeline_manifest': None,
                             'pipeline_name': 'tekton-parameters',
                             'workflow_manifest': '{"kind": "PipelineRun", "apiVersion": "tekton.dev/v1beta1", "metadata": {"name": "pipelinerun-with-taskspec-to-echo-message", "creationTimestamp": null}, "spec": {"pipelineSpec": {"tasks": [{"name": "echo-message", "taskSpec": {"params": [{"name": "MESSAGE", "type": "string", "default": "Hello World!"}]}], "steps": [{"name": "echo", "image": "ubuntu", "resources": {}, "script": "echo $MESSAGE"}]}}}'}}
```

Experiments

[+ Create run](#)[+ Create experiment](#)[Compare runs](#)[Clone run](#)[Archive](#)[Refresh](#)[All experiments](#)[All runs](#)

Filter experiments

**Experiment name****Description****Last 5 runs****Default**

All runs created without specifying an experiment will be grouped here.

 Run name**Status****Duration****Pipeline Version****Recurring Run****Start time** sample-job

-

tekton-parameters

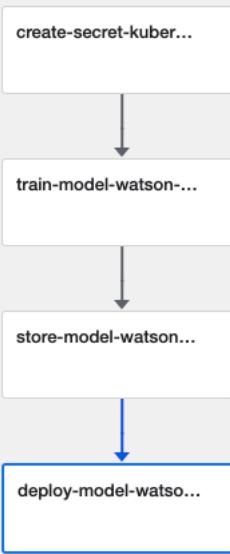
-

5/21/2020, 5:07:46 PM

Pipelines Experiments Artifacts Executions Archive Documentation Github Repo AI Hub Samples

Pipelines ← watson-ml-pipeline (watson-ml-pipeline) + Create run + Upload version + Create experiment Delete

Graph YAML



create-secret-kuber...

train-model-watson...

store-model-watson...

deploy-model-watson...

Summary Hide

ID
c377cb85-0120-443c-972f-04ae642d452a
Version
watson-ml-pipeline

Version source
Uploaded on
5/26/2020, 4:42:19 PM

Description

Input parameters

model_name
scoring_payload
store-model-watson-machine-learning-model_uid

Output parameters

scoring-endpoint /tmp/outputs/scoring_endpoint/data
model-uid /tmp/outputs/model_uid/data

Arguments

```
-u
/app/wml-deploy.py
--model-uid
$(inputs.params.store-model-watson-machine-learning-model_uid)
--model-name
$(inputs.params.model_name)
--scoring-payload
$(inputs.params.scoring_payload)
--deployment-name
--output-scoring-endpoint-path
$(results.scoring-endpoint.path)
--output-model-uid-path
$(results.model-uid.path)
```

Command

python

Image

docker.io/aipipeline/wml-deploy:latest

Volume Mounts

Pipelines

Experiments

Artifacts

Executions

Archive

Documentation

Github Repo

AI Hub Samples

Build commit: unknown

Report an Issue

Pipelines

← watson-ml-pipeline (watson-ml-pipeline)

+ Create run + Upload version + Create experiment Delete

Graph YAML

```
1 apiVersion: tekton.dev/v1beta1
2 kind: PipelineRun
3 metadata:
4   name: kfp-on-wml-training-run
5 spec:
6   params:
7     - name: GITHUB_TOKEN
8       value: ''
9     - name: CONFIG_FILE_URL
10    value: https://raw.githubusercontent.com/user/repository/branch/creds.ini
11    - name: train_code
12      value: tf-model.zip
13    - name: execution_command
14      value: python3 convolutional_network.py --trainImagesFile ${DATA_DIR}/train-images-idx3-ubyte.gz
15      --trainLabelsFile ${DATA_DIR}/train-labels-idx1-ubyte.gz --testImagesFile ${DATA_DIR}/t10k-images-idx3-ubyte.gz
16      --testLabelsFile ${DATA_DIR}/t10k-labels-idx1-ubyte.gz --learningRate 0.001
17      --trainingIters 20000
18    - name: framework
19      value: tensorflow
20    - name: framework_version
21      value: '1.15'
22    - name: runtime
23      value: python
24    - name: runtime_version
25      value: '3.6'
26    - name: run_definition
27      value: wml-tensorflow-definition
28    - name: run_name
29      value: wml-tensorflow-run
30    - name: model_name
31      value: wml-tensorflow-mnist
32    - name: scoring_payload
33      value: tf-mnist-test-payload.json
34    - name: compute_name
35      value: k80
36    - name: compute_nodes
37      value: '1'
38 pipelineSpec:
39   params:
40     - default: ''
41       name: GITHUB_TOKEN
42       default: https://raw.githubusercontent.com/user/repository/branch/creds.ini
43       name: CONFIG_FILE_URL
44       default: tf-model.zip
45       name: train_code
46       default: python3 convolutional_network.py --trainImagesFile ${DATA_DIR}/train-images-idx3-ubyte.gz
47       --trainLabelsFile ${DATA_DIR}/train-labels-idx1-ubyte.gz --testImagesFile ${DATA_DIR}/t10k-images-idx3-ubyte.gz
48       --testLabelsFile ${DATA_DIR}/t10k-labels-idx1-ubyte.gz --learningRate 0.001
49       --trainingIters 20000
50       name: execution_command
```

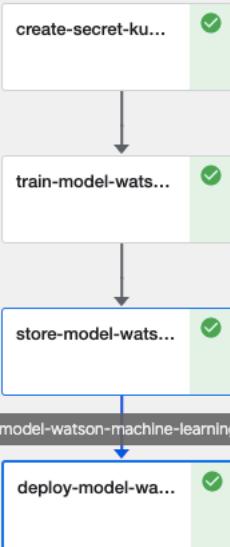
Build commit: unknown

Report an Issue

Run of watson-ml-pipeline (444a2)

Pipelines Experiments Artifacts Executions Archive Documentation Github Repo AI Hub Samples

Graph Run output Config



create-secret-kubeflow
train-model-watson-machine-learning
store-model-watson-machine-learning
deploy-model-watson-machine-learning

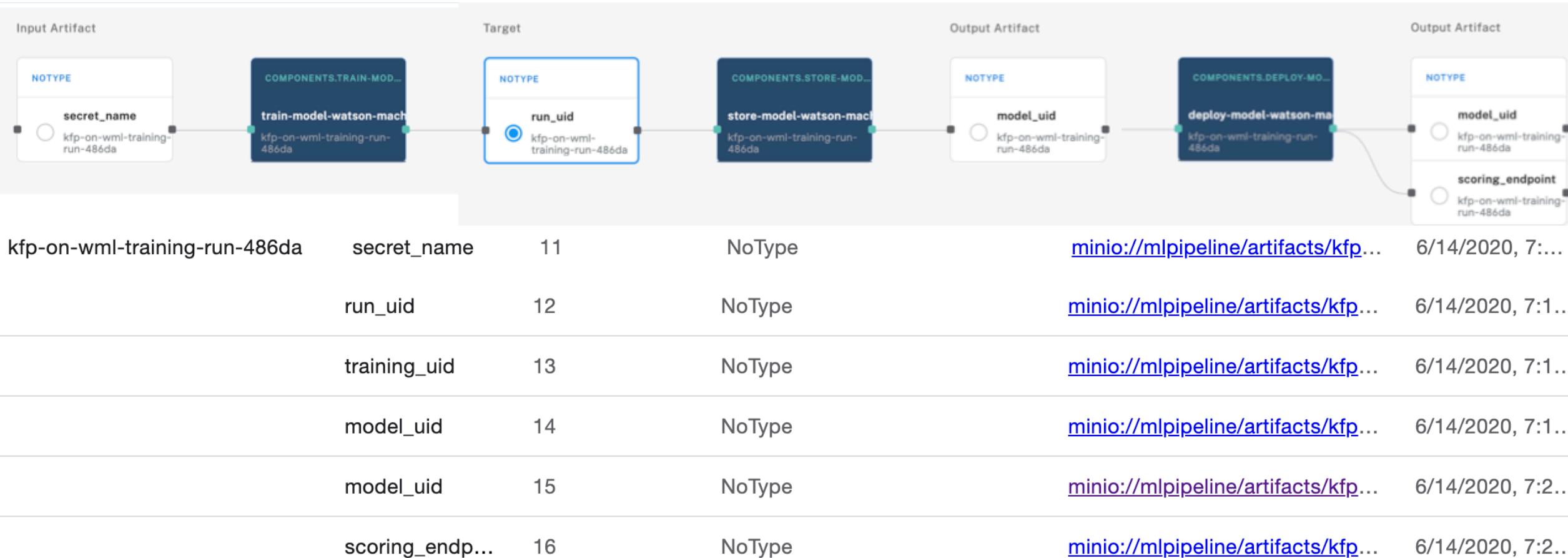
Retry Clone run Terminate Archive

kfp-on-wml-training-run-c2934-deploy-model-watson-machine-8v52x

Artifacts	Input/Output	ML Metadata	Volumes	Manifest	Logs	Pod	Events
1 ----- 2 GUID 3 702d4b5c-075c-4114-b119-96a23a674e35 4 4f635147-da34-4f38-ac39-18116288c6cd 5 8381bf0c-776a-4c21-af1f-2c7a21334ee1 6 8bb3f49c-2b2a-4e2d-88cd-045e139e78c6 7 2e854faf-b091-49f3-858d-0f1d996cbda3	NAME	STATE	CREATED	ARTIFACT_TYPE			
8 ----- 9 10 11 ##### 12 13 Synchronous deployment creation for uid: 'bb170958-a27b-4001-b5d3-6fda6d4265a9' started 14 15 ##### 16 17 18 initializing 19 ready 20 21 22 ----- 23 Successfully finished deployment creation, deployment_uid='170be98d-1135-4ff9-b8e4-a9833fc7f524' 24 25 26 27 deployment_uid: 170be98d-1135-4ff9-b8e4-a9833fc7f524 28 Scoring result: 29 {'predictions': [['values': [5, 4]]]}	wml-tensorflow-mnist	ready	2020-03-19T20:42:52.406Z	model			
3 702d4b5c-075c-4114-b119-96a23a674e35 4 4f635147-da34-4f38-ac39-18116288c6cd 5 8381bf0c-776a-4c21-af1f-2c7a21334ee1 6 8bb3f49c-2b2a-4e2d-88cd-045e139e78c6 7 2e854faf-b091-49f3-858d-0f1d996cbda3	wml-tensorflow-mnist	ready	2020-03-19T19:56:39.104Z	model			
8 ----- 9 10 11 ##### 12 13 Synchronous deployment creation for uid: 'bb170958-a27b-4001-b5d3-6fda6d4265a9' started 14 15 ##### 16 17 18 initializing 19 ready 20 21 22 ----- 23 Successfully finished deployment creation, deployment_uid='170be98d-1135-4ff9-b8e4-a9833fc7f524' 24 25 26 27 deployment_uid: 170be98d-1135-4ff9-b8e4-a9833fc7f524 28 Scoring result: 29 {'predictions': [['values': [5, 4]]]}}	wml-tensorflow-mnist	ready	2020-03-19T19:55:44.681Z	model			
6 8bb3f49c-2b2a-4e2d-88cd-045e139e78c6 7 2e854faf-b091-49f3-858d-0f1d996cbda3	wml-tensorflow-mnist	ready	2020-03-19T19:39:52.485Z	model			
8 ----- 9 10 11 ##### 12 13 Synchronous deployment creation for uid: 'bb170958-a27b-4001-b5d3-6fda6d4265a9' started 14 15 ##### 16 17 18 initializing 19 ready 20 21 22 ----- 23 Successfully finished deployment creation, deployment_uid='170be98d-1135-4ff9-b8e4-a9833fc7f524' 24 25 26 27 deployment_uid: 170be98d-1135-4ff9-b8e4-a9833fc7f524 28 Scoring result: 29 {'predictions': [['values': [5, 4]]]}}	wml-tensorflow-mnist	ready	2020-03-19T01:25:13.537Z	model			

1 -----
2 GUID
3 702d4b5c-075c-4114-b119-96a23a674e35
4 4f635147-da34-4f38-ac39-18116288c6cd
5 8381bf0c-776a-4c21-af1f-2c7a21334ee1
6 8bb3f49c-2b2a-4e2d-88cd-045e139e78c6
7 2e854faf-b091-49f3-858d-0f1d996cbda3
8 -----
9
10
11 #####
12
13 Synchronous deployment creation for uid: 'bb170958-a27b-4001-b5d3-6fda6d4265a9' started
14
15 #####
16
17
18 initializing
19 ready
20
21
22 -----
23 Successfully finished deployment creation, deployment_uid='170be98d-1135-4ff9-b8e4-a9833fc7f524'
24
25
26
27 deployment_uid: 170be98d-1135-4ff9-b8e4-a9833fc7f524
28 Scoring result:
29 {'predictions': [['values': [5, 4]]]}}

Runtime execution graph. Only steps that are currently running or have already completed are shown.



Compiled Pipelines on Tekton

Tekton

Tekton resources ^

- Pipelines
- PipelineRuns**
- PipelineResources
- Tasks
- ClusterTasks
- TaskRuns

Namespace

All Namespaces X ▾

About

Import Tekton resources

Secrets

ServiceAccounts

PipelineRuns

Input a label filter of the format labelKey:labelValue

Status	Name	Pipeline	Namespace	Created	Duration	⋮
✓	kfp-on-wml-training-run...	kfp-on-wml-training	default	20 hours ago	6 minutes 23 seconds	⋮
✓	launch-trusted-ai-pipel...	launch-trusted-ai-pipeline	anonymous	2 days ago	9 minutes 3 seconds	⋮
✓	conditional-execution-pip...	conditional-execution-pip...	default	2 days ago	52 seconds	⋮
✓	end-to-end-pipeline-run	end-to-end-pipeline	anonymous	2 days ago	14 minutes 41 seconds	⋮

Create +

Running Pipelines on Tekton

Tekton

Tekton resources ^

- Pipelines
- PipelineRuns**
- PipelineResources
- Tasks
- ClusterTasks
- TaskRuns

Namespace

default x v

About

Import Tekton resources

Secrets

ServiceAccounts

kfp-on-wml-training-run-p7n6f 20 hours ago

Succeeded Tasks Completed: 4, Skipped: 0 □

✓ create-secret-kubernetes...
✓ train-model-watson-mac...
✓ train-mode... Completed
✓ store-model-watson-ma...
✓ deploy-model-watson-m...

✓ train-model-watson-machine-learning Completed

Logs Status Details

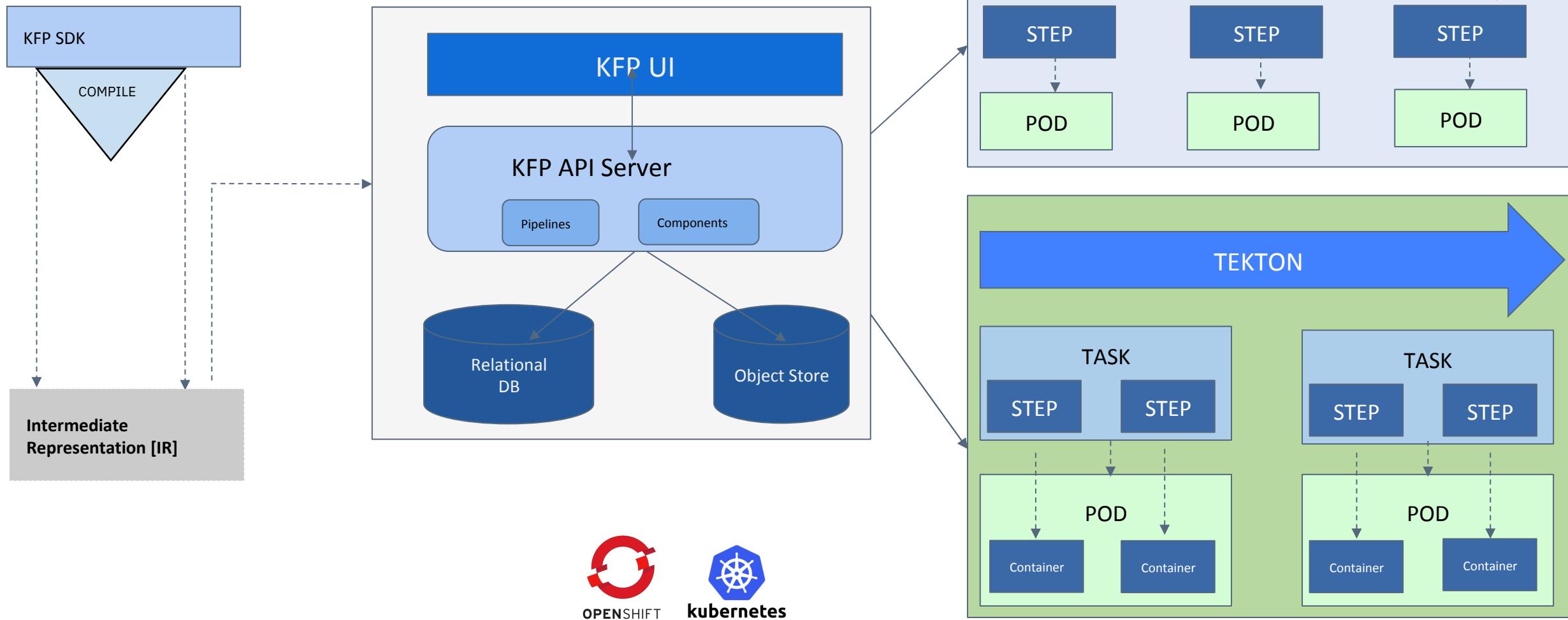
training_id {'metadata': {'created_at': '2020-05-07T23:57:46.868Z', 'guid': 'b200eef4-3dde-4b4e-a521-fe751735932c'}, 'get_status {'state': 'running'}}

Log monitor started for training run: b200eef4-3dde-4b4e-a521-fe751735932c

Log monitor done.

Metric monitor started for training run: b200eef4-3dde-4b4e-a521-fe751735932c

Future: KFP – Tekton Phase Three



Pluggable Components



Useful Links

Main Open Source Github Repository:

<https://github.com/kubeflow/kfp-tekton>

IBM internal Slack channels

#kfp-tekton

#kubeflow

The Kubeflow external Slack workspace is

kubeflow.slack.com

To join, click here

https://join.slack.com/t/kubeflow/shared_invite/zt-cpr020z4-PfcAue_2nw67~iIDy7maAQ

