

Meeting of the Technical Advisory Council (TAC)

May 6, 2021

 **DLF** AI & DATA

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Recording of Calls

Reminder:

TAC calls are recorded and available for viewing on the [TAC Wiki](#)

Reminder: LF AI & Data Useful Links

- › Web site: lfaidata.foundation
- › Wiki: wiki.lfaidata.foundation
- › GitHub: github.com/lfaidata
- › Landscape: <https://landscape.lfaidata.foundation> or <https://l.lfaidata.foundation>
- › Mail Lists: <https://lists.lfaidata.foundation>
- › Slack: <https://slack.lfaidata.foundation>
- › Youtube: <https://www.youtube.com/channel/UCfasaeqXJBCAJMNO9HcHfbA>
- › LF AI Logos: <https://github.com/lfaidata/artwork/tree/master/lfaidata>
- › LF AI Presentation Template:
https://drive.google.com/file/d/1eiDNJvXCqSZHT4Zk_-czASlz2GTBRZk2/view?usp=sharing
- ›
- › Events Page on LF AI Website: <https://lfaidata.foundation/events/>
- › Events Calendar on LF AI Wiki (subscribe available):
<https://wiki.lfaidata.foundation/pages/viewpage.action?pageId=12091544>
- › Event Wiki Pages: <https://wiki.lfaidata.foundation/display/DL/LF+AI+Data+Foundation+Events>

Agenda

- › Roll Call (2 mins)
- › Approval of Minutes from April 22nd (3 mins)
- › Welcome any new Members

- › Two Sandbox Proposals (50 minutes = 2 x 25 minutes)
 - › ML eXchange (MLX) (Animesh Singh)
 - › Vulcan Kompute (Alejandro Saucedo)

- › LFAI General Updates (2 minutes)
- › Open Discussion (3 minutes)

TAC Voting Members

* = still need backup specified on [wiki](#)

Board Member	Contact Person	Email
AT&T	Anwar Atfab*	anwar@research.att.com
Baidu	Ti Zhou	zhouti@baidu.com
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OPPO	Yifan Xi*	jiyifan@oppo.com
SAS	Nancy Rausch	nancy.rausch@sas.com
Tech Mahindra	Nikunj Nirmal	nn006444@techmahindra.com
Tencent	Bruce Tao	brucetao@tencent.com
Zilliz	Jun Gu*	jun.gu@zilliz.com
ZTE	Wei Meng	meng.wei2@zte.com.cn
Graduate Project	Contact Person	Email
Acumos	Nat Subramanian	natarajan.subramanian@techmahindra.com
Angel	Bruce Tao	brucetao@tencent.com
Egeria	Mandy Chessell	mandy_chessell@uk.ibm.com
Horovod	Travis Addair*	taddair@uber.com
ONNX	Jim Spohrer (Chair of TAC)	spohrer@us.ibm.com
Pyro	Fritz Obermeyer*	fritz.obermeyer@gmail.com

Approval of April 22th, 2021 Minutes

Draft minutes from the April 22th TAC call were previously distributed to the TAC members via the mailing list

Proposed Resolution:

- › That the minutes of the April 22th meeting of the Technical Advisory Council of the LF AI & Data Foundation are hereby approved.

Members (45)

<https://landscape.lfai.foundation/card-mode?project=company>



- **New Members**

- **Premier:** Guangdong OPPO Mobile Telecommunications Corp (China)
- **Associate:** Chaitanya Bharathi Institute Of Technology (India)

Sandbox Proposal - ML eXchange (MLX)

Animesh Singh (IBM) <asingh@us.ibm.com>

Project Contribution Proposal Review & Discussion: Machine Learning eXchange (MLX)

We are open sourcing **Machine Learning Exchange (MLX)**, a Data and AI Assets Catalog and Execution Engine. It allows upload, register, execute, and deploy: AI pipelines and Components, Models, Datasets, Notebooks. Additionally it provides: Automated sample pipeline code generation to execute registered models, datasets and notebooks, Pipelines Engine powered by Kubeflow Pipelines on Tekton, core of Watson Pipelines, Serving engine by KFServing (Next gen base for WML), Datasets Management by Datashim, Preregistered Datasets from Data Asset Exchange (DAX) and Models from Model Asset Exchange (MAX), Model Metadata schema aligned with MLSpec.

We have also been exploring integration with Acumos projects.

Presenter: Animesh Singh (IBM) <asingh@us.ibm.com>

Resources:

Github: <https://github.com/machine-learning-exchange>

Project Level: Sandbox

Proposal: <https://github.com/lfaifai/proposing-projects/pull/42/files>

Machine Learning Exchange (MLX)

Animesh Singh, Christian Kadner, Tommy Li



Machine Learning Exchange (MLX) : Data and AI Assets Catalog and Execution Engine

MLX

- Datasets
- Models
- Pipelines
- Components
- Notebooks
- KFServices

Pipelines
Pipelines for your machine learning workloads.
[VIEW EXPERIMENTS](#) [VIEW ALL PIPELINES](#) [REGISTER A PIPELINE](#)

Datasets
Datasets for your machine learning workloads.
[VIEW ALL DATASETS](#) [REGISTER A DATASET](#)

Notebooks
Notebooks for your data science tasks.
[VIEW ALL NOTEBOOKS](#) [REGISTER A NOTEBOOK](#)

Models
Machine learning models that can be used in your pipelines.
[VIEW ALL MODELS](#) [REGISTER A MODEL](#)

Model Cards:

- MAX Human Pose Estimator**
IBM Model Asset eXchange(MAX) model that detects humans in an image and estimate the pose for each person.
Human Pose Estimation
- MAX Image Caption Generator**
IBM Model Asset eXchange(MAX) model that generates captions from a fixed vocabulary describing the contents of images in the COCO dataset.
Image-To-Text Translation
- MAX Image Resolution Enhancer**
IBM Model Asset eXchange(MAX) model that upscales an image by a factor of 4, while generating photo-realistic details.
Super-Resolution
- MAX Object Detector**
IBM Model Asset eXchange(MAX) model that localizes and identifies multiple objects in a single image.
Object detection in images
- MAX Optical Character Recognition**
IBM Model Asset eXchange(MAX) model that identifies text in an image.
Optical Character Recognition
- MAX Question Answering**
IBM Model Asset eXchange(MAX) model that answers questions on a given corpus of text.
Question and Answer
- MAX Recommender System**
IBM Model Asset eXchange(MAX) model that generates personalized recommendations.
Recommendations
- MAX Text Sentiment Classifier**
IBM Model Asset eXchange(MAX) model that detects the sentiment captured in short pieces of text.
Sentiment Analysis

Machine Learning Exchange (MLX)

– Data and AI Assets Catalog and Execution Engine

– Upload, register, execute, and deploy

-AI pipelines and Components

-Models

-Datasets

-Notebooks

– Automated sample pipeline code generation to train, validate, serve your registered models, datasets and notebooks

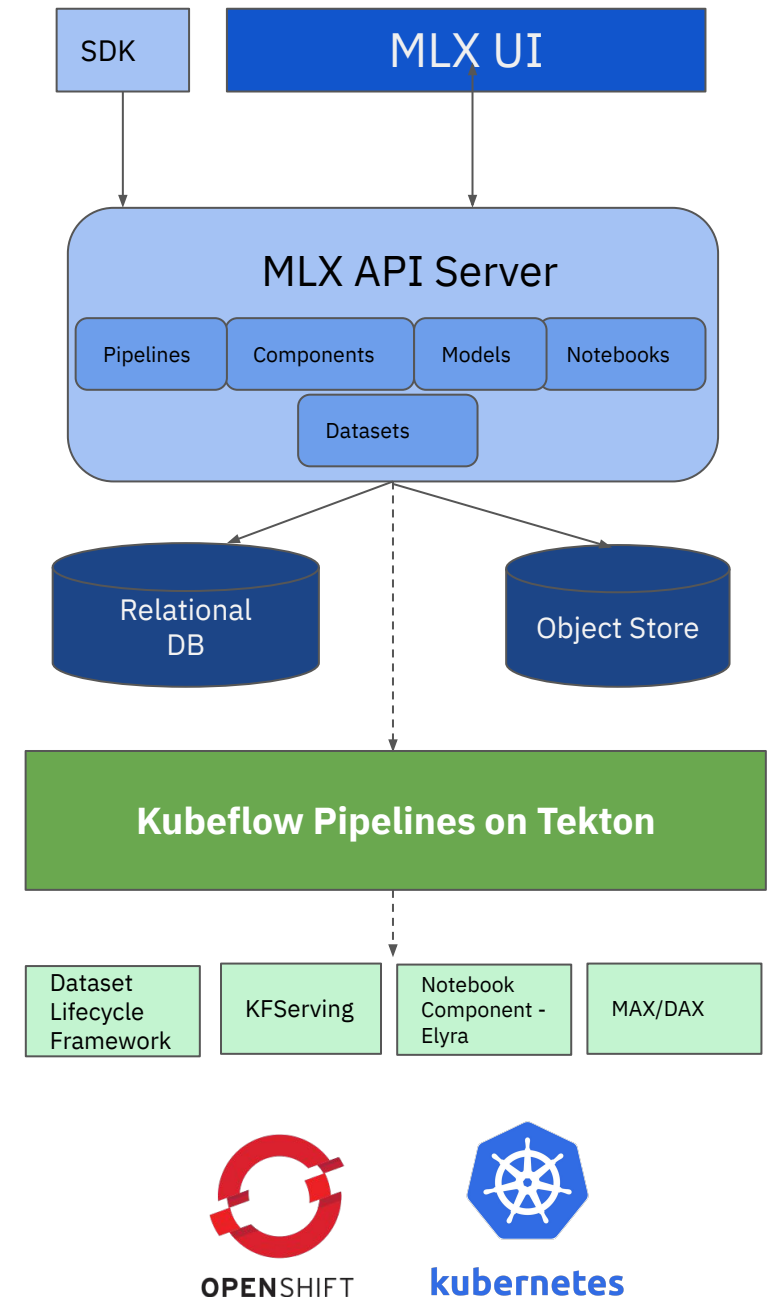
– Pipelines Engine powered by Kubeflow Pipelines on Tekton, core of Watson Pipelines

– Serving engine by KFServing (Next gen base for WML) , Datasets Management by Dataset Lifecycle Framework

– Preregistered Datasets from Data Asset Exchange (DAX) and Models from Model Asset Exchange

(MAX)

– Model Metadata schema aligned with MLSpec



View, download, and execute Pipelines

The screenshot displays the MLX Pipelines interface. On the left is a dark sidebar with the MLX logo and navigation links for Datasets, Models, Pipelines (highlighted), and Notebooks. The main content area features a header with the title 'Pipelines' and the subtitle 'Pipelines for your machine learning workloads.' Below the header are three buttons: 'VIEW EXPERIMENTS', 'VIEW ALL PIPELINES', and 'REGISTER A PIPELINE'. The main area contains a grid of eight pipeline components, each with a title, a description, and an 'OpenSource' button.

Component Name	Description	License
mnist-model-cleanup	Component for your Pipelines.	OpenSource
mnist-e2e-ml-pipeline	Component for your Pipelines.	OpenSource
init_container	Component for your Pipelines.	OpenSource
reefer-demo-pipeline	Component for your Pipelines.	OpenSource
Parallel Join	Component for your Pipelines.	OpenSource
any_sequencer	Component for your Pipelines.	OpenSource
calc_pipeline	Component for your Pipelines.	OpenSource
etl-spark-no-cred	Component for your Pipelines.	OpenSource

View, download, and execute Pipeline Components

The screenshot displays the MLX Components interface. On the left is a dark sidebar with navigation icons for Datasets, Models, Pipelines, Components (highlighted), Notebooks, and KFServices. The main content area has a dark header with the MLX logo and the title 'Components' in white. Below the title is the subtitle 'Components that can be used to build your pipelines.' and two buttons: 'VIEW ALL COMPONENTS' and 'REGISTER A COMPONENT'. The main area contains a grid of eight component cards, each with a title, description, and an 'OpenSource' or provider label.

Component Name	Description	License/Provider
Create Dataset Volume	Manage Dataset Lifecycle Framework datasets.	OpenSource
Deploy Model - KFServing	Serve Models using Kubeflow KFServing.	OpenSource
Deploy Model - Kubernetes	Deploy AI models using Kubernetes deployment.	OpenSource
Deploy Model - Watson Machine Learning	Deploy stored model on Watson Machine Learning as a web service.	IBM Watson Machine Learning
Echo	Sample component for testing.	OpenSource
Generate Dataset Metadata	Convert Data Asset EXchange YAML files to Dataset Lifecycle Framework YAML files.	OpenSource
Jupyter	Runs a jupyter notebook and saves to object storage.	OpenSource
Model Robustness Check - PyTorch	Perform a robustness check using fast gradient attack with ART to make sure the model is robust against simple gradient changes.	OpenSource

Library of prepackaged models. Register your own models, run with Pipelines

The screenshot displays the IBM MLX Models library interface. At the top left is the MLX logo, a stylized brain with a bar chart. Below it is a navigation sidebar with icons and labels for 'Datasets', 'Models' (which is highlighted), 'Pipelines', and 'Notebooks'. The main header area features the title 'Models' and the subtitle 'Machine learning models that can be used in your pipelines.' Two buttons, 'VIEW ALL MODELS' and 'REGISTER A MODEL', are positioned below the subtitle. The main content area is a grid of model cards. Each card includes a title, a brief description of the model's function, a category label in a rounded rectangle, and a small orange icon of a hand pointing up. The models shown are: MAX Human Pose Estimator (Human Pose Estimation), MAX Image Caption Generator (Image-To-Text Translation), MAX Image Resolution Enhancer (Super-Resolution), MAX Object Detector (Object detection in images), MAX Optical Character Recognition (Optical Character Recognition), MAX Question Answering (Question and Answer), MAX Recommender System (Recommendations), MAX Text Sentiment Classifier (Sentiment Analysis), MAX Toxic Comment Classifier, and MAX Weather Forecaster. A '...' icon is visible at the bottom left of the sidebar.

Library of prepackaged notebooks. Register your own notebooks

The screenshot shows the MLX Notebooks library interface. On the left is a dark sidebar with the MLX logo (a brain with a bar chart) and navigation links for Datasets, Models, Pipelines, and Notebooks. The main content area has a header with the title 'Notebooks' and the subtitle 'Notebooks for your data science tasks.' Below the header are two buttons: 'VIEW ALL NOTEBOOKS' and 'REGISTER A NOTEBOOK'. The main area displays a grid of notebook cards. Each card includes a title, a brief description, and a button indicating its license or platform (e.g., 'OpenSource' or 'Watson Machine Learning').

Notebook Title	Description	License/Platform
AIF360 Bias detection example	Detecting and mitigating age bias on credit decisions.	OpenSource
AIF360 Gender Classification	AIF360 Gender Classification with reweighing.	OpenSource
ART detector model	Notebook to train ART detector model to detect possible adversarial attack.	OpenSource
ART poisoning attack	Use Notebook to leverage ART for poisoning training data and learn how to defend it.	OpenSource
JFK Airport Analysis	An end-to-end project to load in weather data from Data Asset eXchange, prepare the data into a wide format, build some machine learning models, and then deploy those built models.	OpenSource
Train and deploy with Watson Machine Learning	Notebook for creating an end to end pipeline that trains a model on Watson Machine Learning.	Watson Machine Learning

Run Notebooks using Pipelines

MLX

JFK Airport Analysis

An end-to-end project to load in weather data from Data Asset eXchange, prepare the data into a wide format, build some machine learning models, and then deploy those built models.

← NOTEBOOKS DOWNLOAD

DETAILS LAUNCH **YAML DEFINITION** NOTEBOOK CODE

Create a Trial Run

Complete the following inputs and hit 'Submit' to run the notebooks in a sample pipeline.

Run Name
JFK Airport Analysis
Enter a name to be used for the trial run.

Dataset PVC

Enter a dataset pvc to be used

Mount Path

Enter a mount path to be used

SUBMIT

YAML DEFINITION

```
from statsmodels.tsa.statespace.sarimax import SARIMAX
from statsmodels.tsa.arima_model import ARIMAResults

import warnings
warnings.filterwarnings('ignore')
```

Read Data

The NOAA JFK dataset contains 114,546 hourly observations of various local climatological variables (including visibility, temperature, wind speed and direction, humidity, dew point, and pressure). The data was collected by a NOAA weather station located at the John F. Kennedy International Airport in Queens, New York.

In [3]:
`fname = os.getenv("DATA_DIR", "data-vol-1") + '/noaa-weather-data-jfk-airport.tar.gz'`

In [4]:
`# Extracting the dataset
tar = tarfile.open(fname)
tar.extractall()
tar.close()`

In [5]:
`# Set the data path
data_path = 'noaa-weather-data-jfk-airport/jfk_weather.csv'`

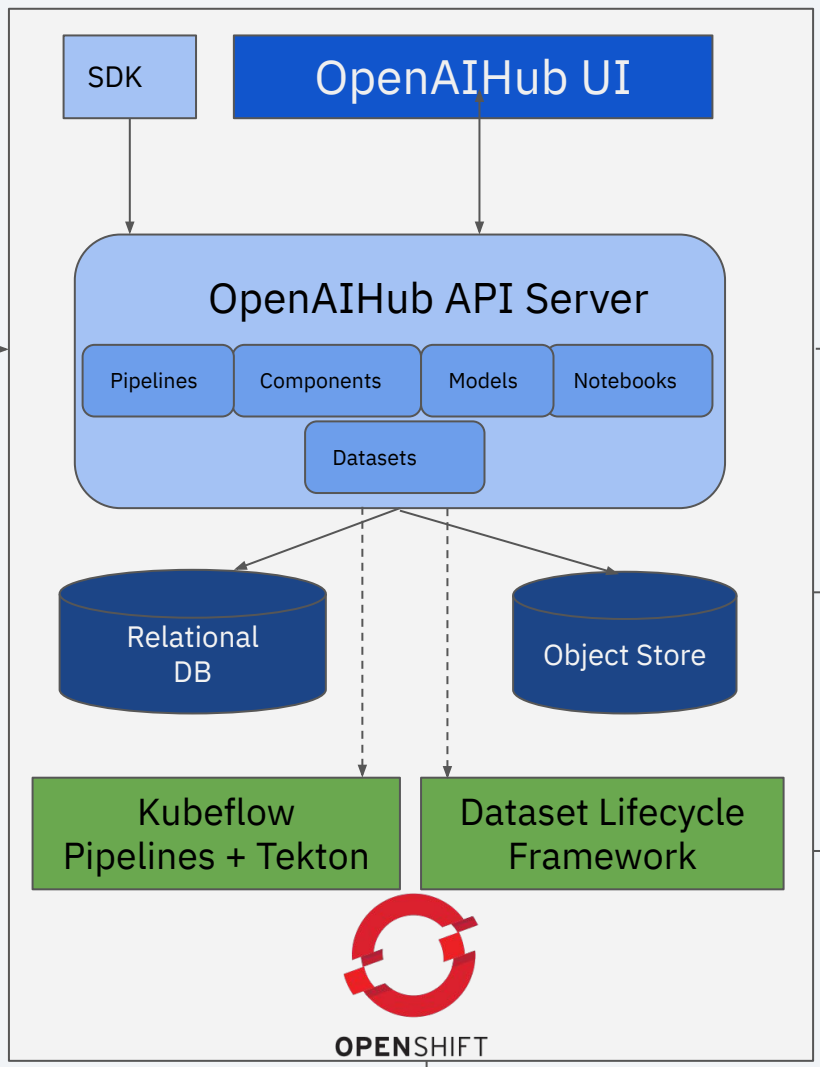
In [6]:
`# Display first five rows of the data
raw_data = pd.read_csv(data_path, parse_dates=['DATE'])
raw_data.head()`

Out [6]:

Dataset Integration

```

basic:
dataset_name: Finance Proposition Bank
short_description: Text from approximately 1000 English sentences obtained from IBM's public annual financial reports, annotated with a 1
source: Data Asset eXchange
source_link: https://developer.ibm.com/exchanges/data/all/finance-proposition-bank/
download_link: https://dax-cdn.cdn.appdomain.cloud/dax-finance-proposition-bank/1.0.2/finance_proposition_bank.tar.gz
format: CoNLL-U
# Let's say user prefers to use this data. Next step is to check the license details.
usage:
license: CDLA-Sharing
license_link: https://cdla.io/sharing-1-0/
domain: Natural Language Processing
# How big is the data? What areas do they cover?
statistics:
number_of_records: ~1,000 annotated sentences corresponding to ~50,000 words
size: 2.9 MB
coverage: This dataset contains labeled sentences from IBM's publicly available annual financial reports.
# Let's say data coverage is ok - next step is to preview the data and know about it
explore_data:
data_preview_glossary: https://dax-cdn.cdn.appdomain.cloud/dax-finance-proposition-bank/1.0.2/data-preview/index.html
# Where do they come from? These are additional details about the data in case user prefers to learn more about.
origin:
source: IBM Research
# starter code to play with the data
assets:
ws_project: https://dataplatfom.cloud.ibm.com/analytics/notebooks/v2/0e615c46-5e4c-496f-9374-25dde48b46d0/view?access_token=aa16e0d5e344
updates:
latest: September 12, 2019
keywords: Artificial Intelligence, Natural Language Processing, Text
  
```



Option One

Create PVCs and Mount

Option Two

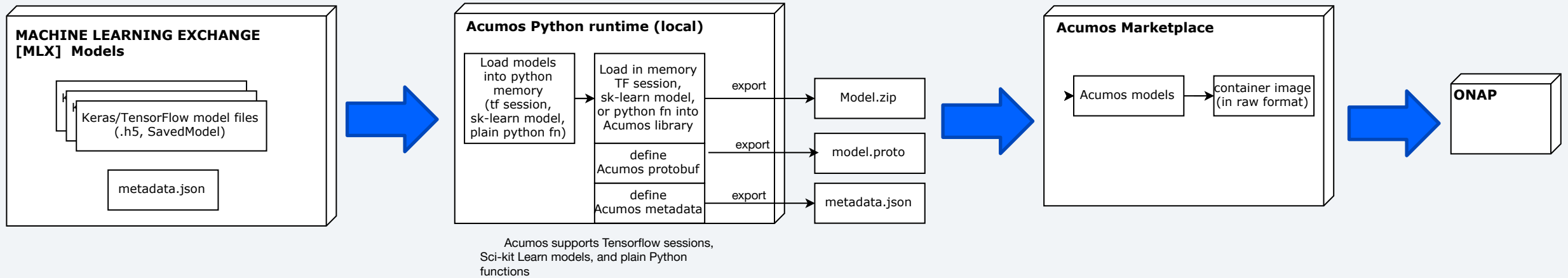
Cache locally if plugin available (e.g. Ceph)

Generate sample Pipelines

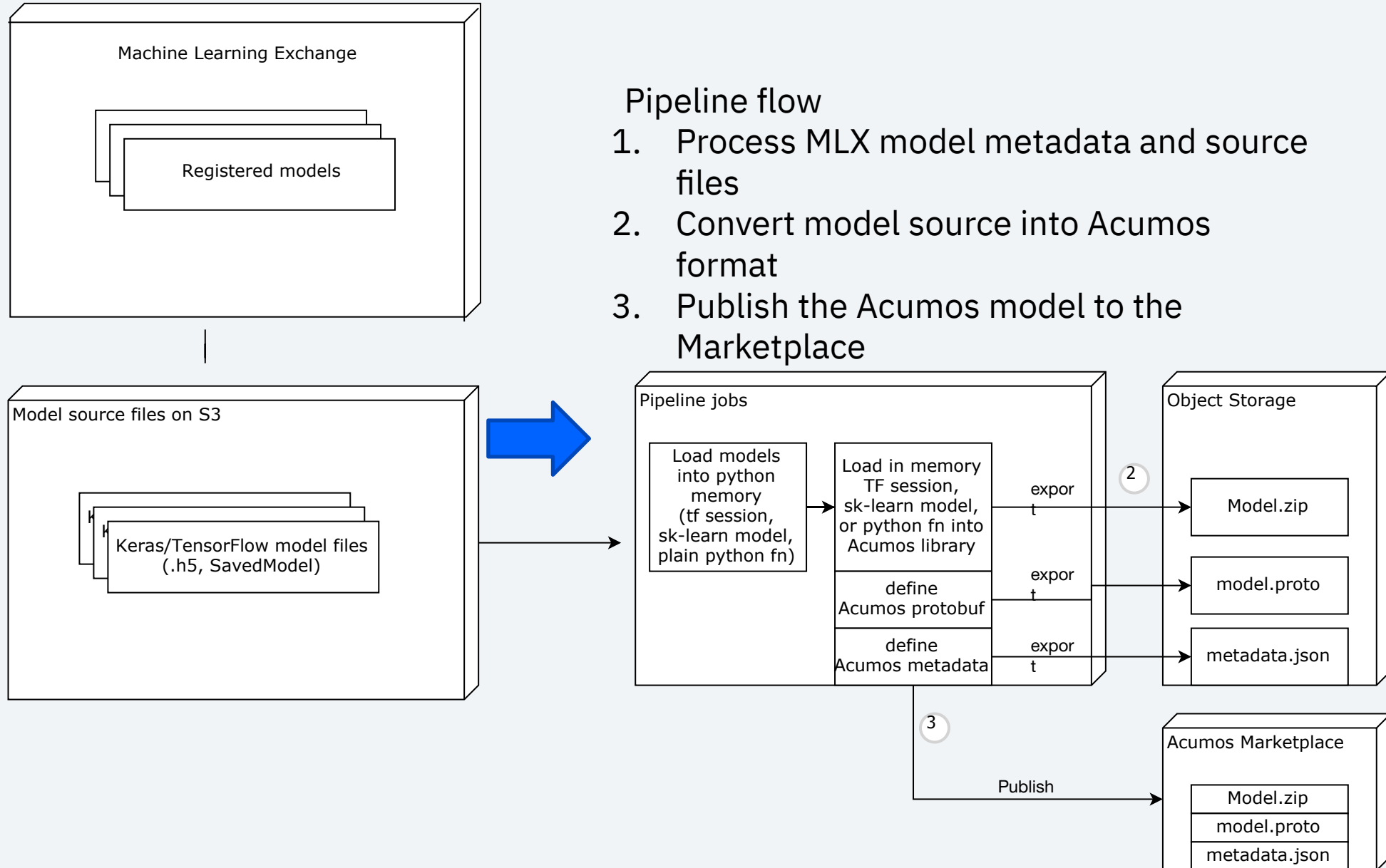
Data and AI Platform and Open Source Artifacts

- IBM Spark
- Watson Studio
- WML
- Open Scale
- KUBEFLOW SERVING
- SELDON
- ...
- ...

MLX and Acumos – High Level Flow



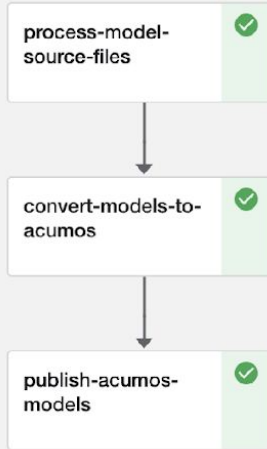
MLX to Acumos Marketplace Pipeline



← ✓ Run of acumos-pipeline (bc643)

Graph Run output Config

Simplify Graph



- [Pipelines](#)
- [Experiments](#)
- [Runs](#)
- [Recurring Runs](#)
- [Artifacts](#)
- [Executions](#)

- [Documentation](#)
- [Github Repo](#)

TAC Vote on Project Proposal: ML eXchange (MLX)

Proposed Resolution:

The TAC approves the ML eXchange (MLX) as a Sandbox project of the LF AI & Data Foundation

Next Steps

LF AI & Data staff will work with ML eXchange (MLX) to onboard the project leading to the announcement of the project joining LF AI & Data

Explore potential integrations between the sandbox project and other LF AI & Data projects

Integrate the sandbox project with LF AI & Data operations

Sandbox Proposal - Vulcan Kompute

Alejandro Saucedo <axsauze@gmail.com>

Project Contribution Proposal Review & Discussion: Vulcan Kompyte

General purpose GPU compute framework for cross vendor graphics cards (AMD, Qualcomm, NVIDIA & friends). Blazing fast, mobile-enabled, asynchronous and optimized for advanced GPU data processing usecases. Typical usecases are: General Purpose GPU Computing, Develop GPU accelerated kernels for advanced data processing use-cases, Extend scientific applications to enable for mobile and cross vendor GPU support.

Presenter: Alejandro Saucedo <axsauze@gmail.com>

Resources:

Github: <https://github.com/EthicalML/vulkan-kompute>

Project Level: Sandbox

Proposal: <https://github.com/lfai/proposing-projects/pull/40/commits/cf502f741f045ee3ffe080165ef5c3b550a2fc40>

Vulkan Kompute

Linux Foundation Proposal for Vulkan Kompute as
Sandbox project focused on advancement of
cross-vendor GPGPU

Alejandro Saucedo

[@AxSaucedo](#)

IT'S BREATHTAKING.



High level Objectives

Motivations & Background

Objectives of Kompute Initiative

Project Features

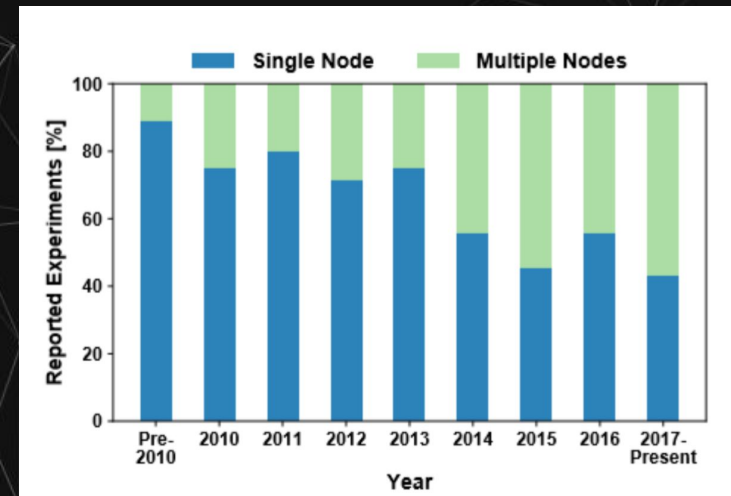
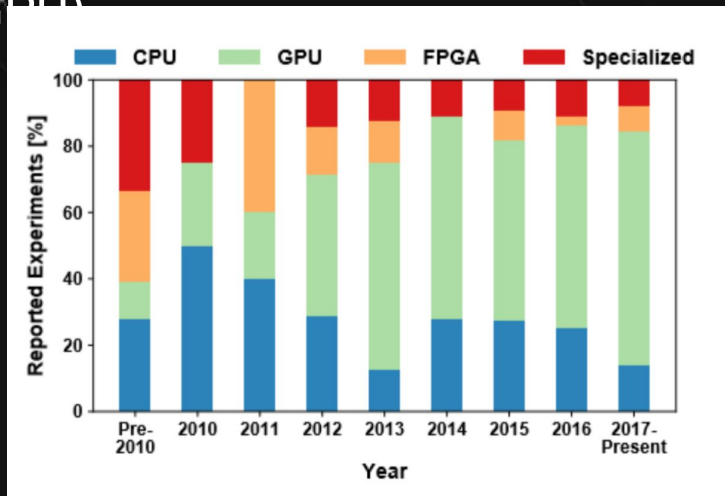
Linux Foundation Proposal

Collaboration with LF projects

Next Steps

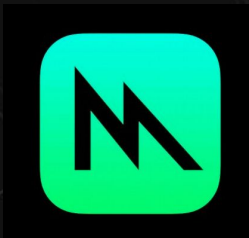
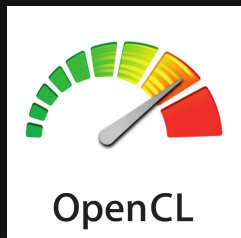
Parallel Compute Motivations

- Fast-growing increase in adoption of standard and specialised GPUs for general compute
- Functions can often be reduced to highly parallelizable stages (Matrix Mult, ML Layers, etc)
- Micro-batching allows for further parallelization of multiple inputs (eg. cost instead of loss)
- Breaking up fractions of each ensemble comp. across tightly coupled hardware (eg. multi-GPU)



Ben-Nun, Tal, and Torsten Hoefler. "Demystifying parallel and distributed deep learning: An in-depth concurrency analysis." ACM Computing Surveys (CSUR) 52.4 (2019): 1-43.

Parallel Processing: Options



Do you
not have
Phones?



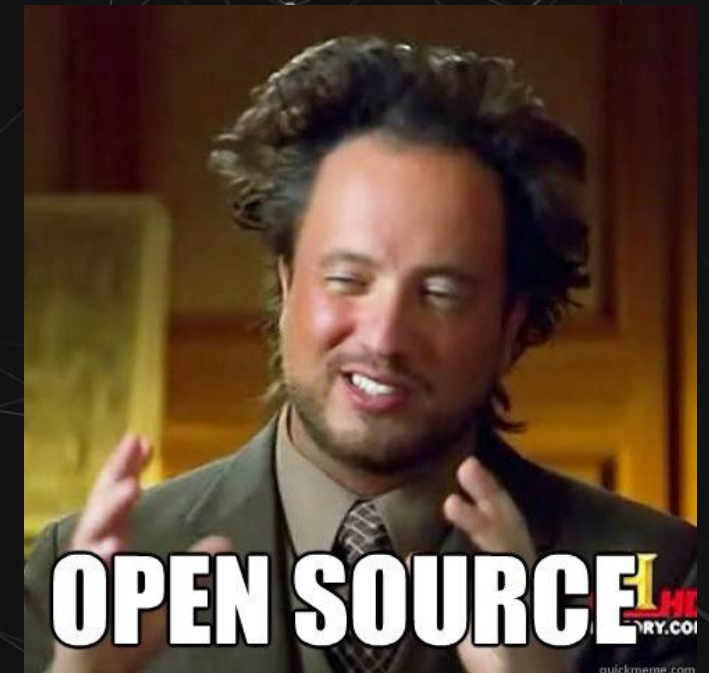
Introducing Vulkan

Created by the Khronos group

The Khronos Group, Inc. is a non-profit member-funded industry consortium, focused on the creation of open standard, royalty free APIs for authoring and accelerated playback of dynamic media on a wide variety of platforms and devices.

Top Vulkan Priorities

1. Performance
2. Interoperability
3. Performance



Khronos Members



GPU users,
vendors &
suppliers
all support,
contribute,
and further
these
initiatives

Led & Supported by Key Players



NVIDIA DEVELOPER

HOME

BLOG

FORUMS

DOCS

DOWNLOADS

TRAINING



ACCOUNT

SOLUTIONS ▾

PLATFORMS ▾

RESOURCES ▾

Vulkan at NVIDIA

NVIDIA provides fully conformant Vulkan 1.2 drivers across our products including GeForce and Quadro on Windows and Linux, Shield Android TV, and the range of Jetson embedded processors using Android or Linux. NVIDIA Nsight™ tools enable developers with cutting-edge Vulkan application debugging, profiling and optimization capabilities.

<https://developer.nvidia.com/vulkan>

Vulkan C++ SDK

Advantages

- Low level with rich access to components
- Explicit and verbose on what is being achieved, with C-style API as core
- A broad range of top players leading the development of the framework
- Highly compatible across different platforms, mobile, and different suppliers

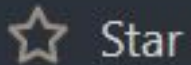
Disadvantages

- Low level with rich access to components
- Explicit and verbose on what is being achieved, with C-style API as core
- A broad range of top players leading the development of the framework
- Highly compatible across different platforms, mobile, and different suppliers



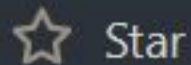
**Only takes about
500-2000+ lines of C++ code...**

Major Projects Code Replication



Star

5.5k

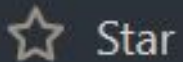


Star

47.2k

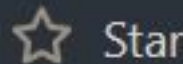


ncnn



Star

11,233



Star

154k

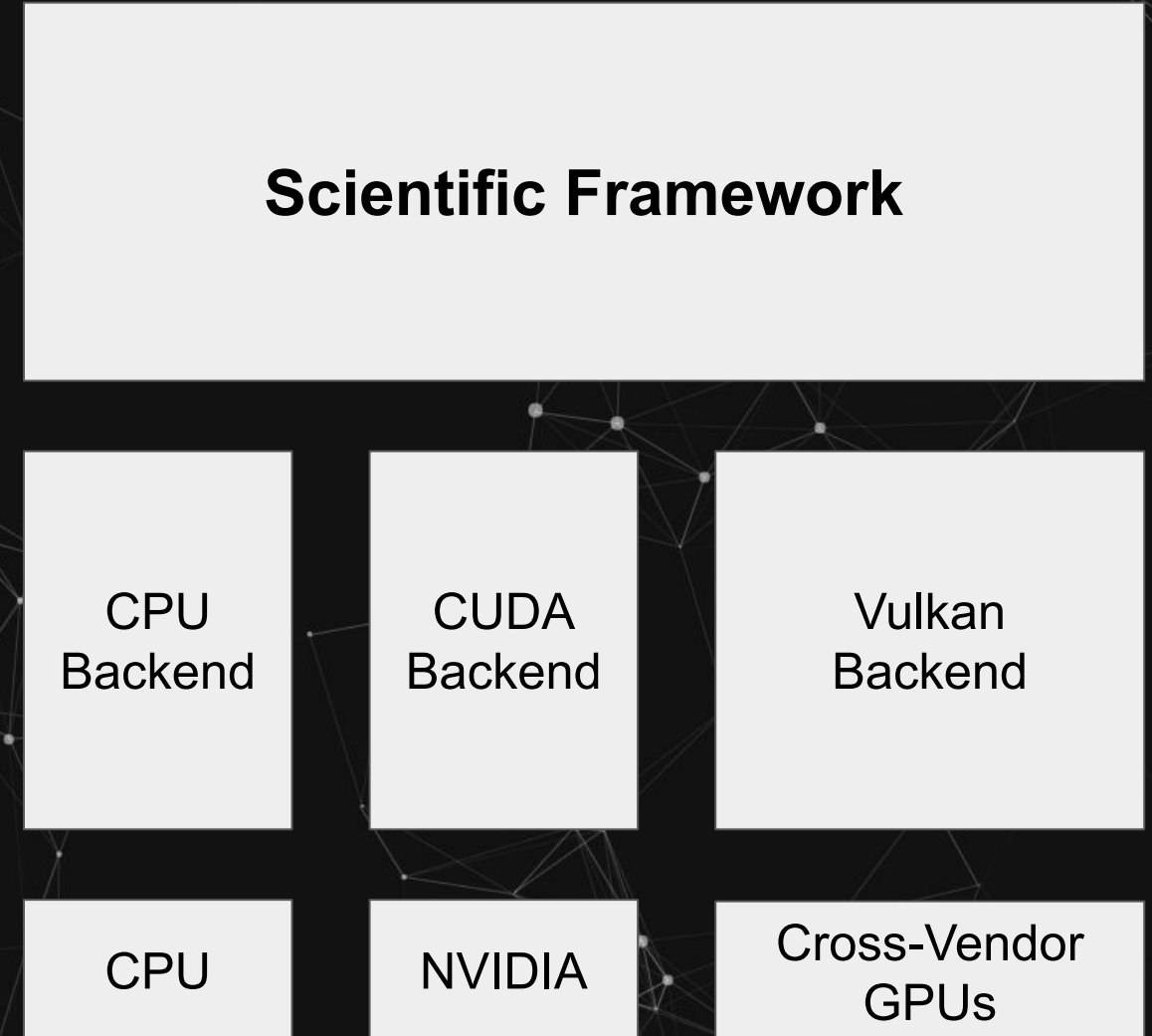
Implementations of Vulkan

- Each repository has hundreds/thousands of lines of replicated logic across
- Overhead of maintenance of custom and complex vulkan wrapper code
- Code replication leads to lack of standardisation in the underlying interaction with Vulkan interface
- Potential bugs can be introduced in replicated code with replicated efforts to fix them

Vulkan Location

Where does Vulkan sit in the stack?

- Vulkan SDK is being adopted as a backend for introducing cross-vendor GPU capabilities
- The Vulkan SDK is being adopted despite high barrier entry
- Vulkan SDK provides access to thousands of GPUs and specialised hardware



Enter Kompute

The General Purpose Cross-Vendor GPU Computing Framework.

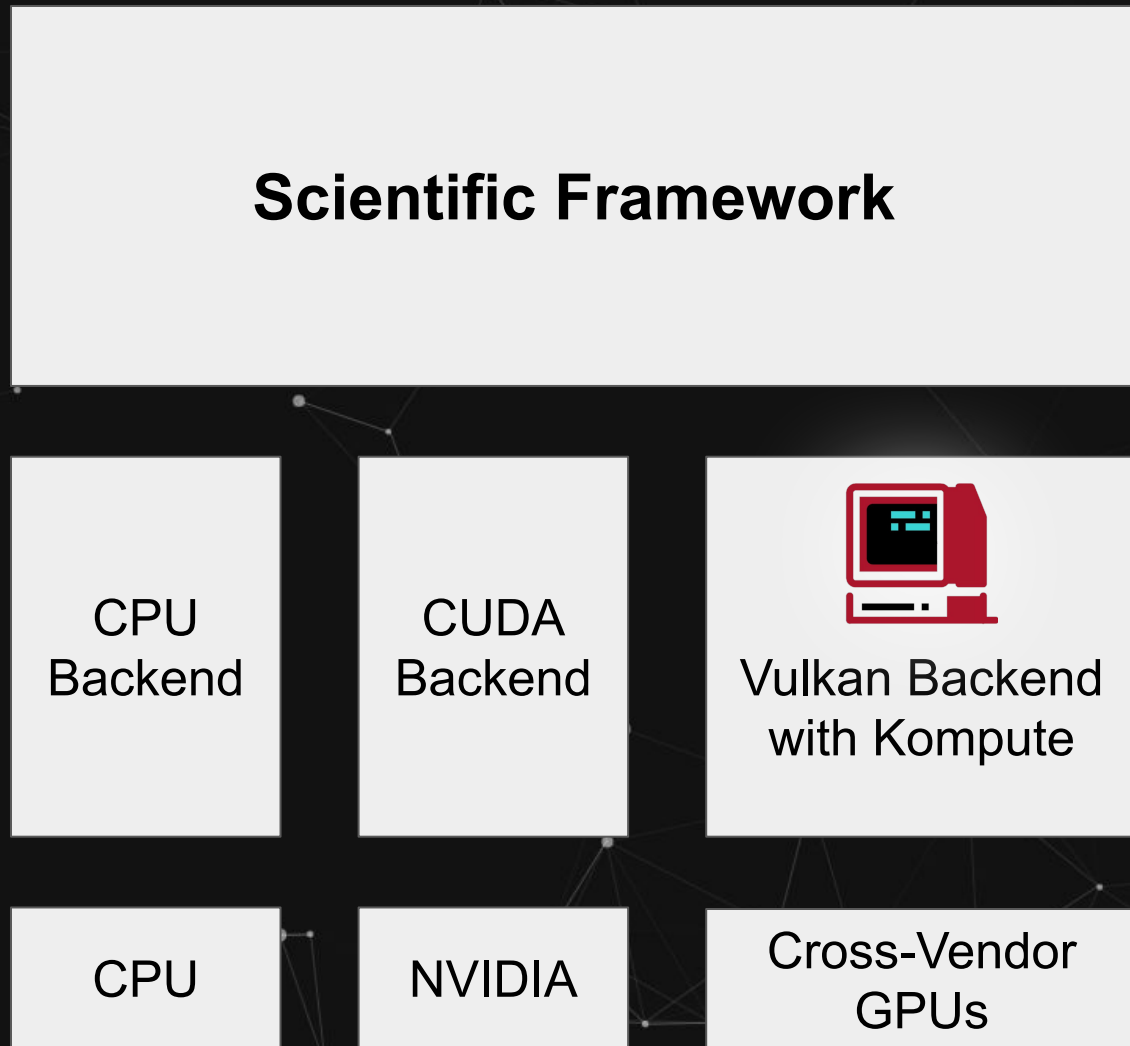
- **Dozens** instead of thousands of lines of code required
- **Augments** Vulkan interface instead of abstracting it
- **BYOV**: Bring-your-own-Vulkan design to play nice with existing Vulkan applications
- **Non-Vulkan name convention** to disambiguate components



KOMPUTE

Kompute Location

Where does Kompute sit in the stack?



High Level Overview of Features

- C++ Interface with Python Bindings
- Extensible operation-based architecture
- Robust testing with 90% code cov
- Exposes low level GPU resources
- Edge integration with Raspberry Pi
- Integration with Mobile Apps
- Integration with Game Engines



Vulkan Kompute: Architecture

Top level resource that manages Vk Device and Vk Queue

Kompute Manager

Kompute Sequence

Manages & executes operations as batch in GPU as record commands and queue submits

Core data unit component to transfer and process via GPU memory and buffers

Kompute Operation

Kompute Operation

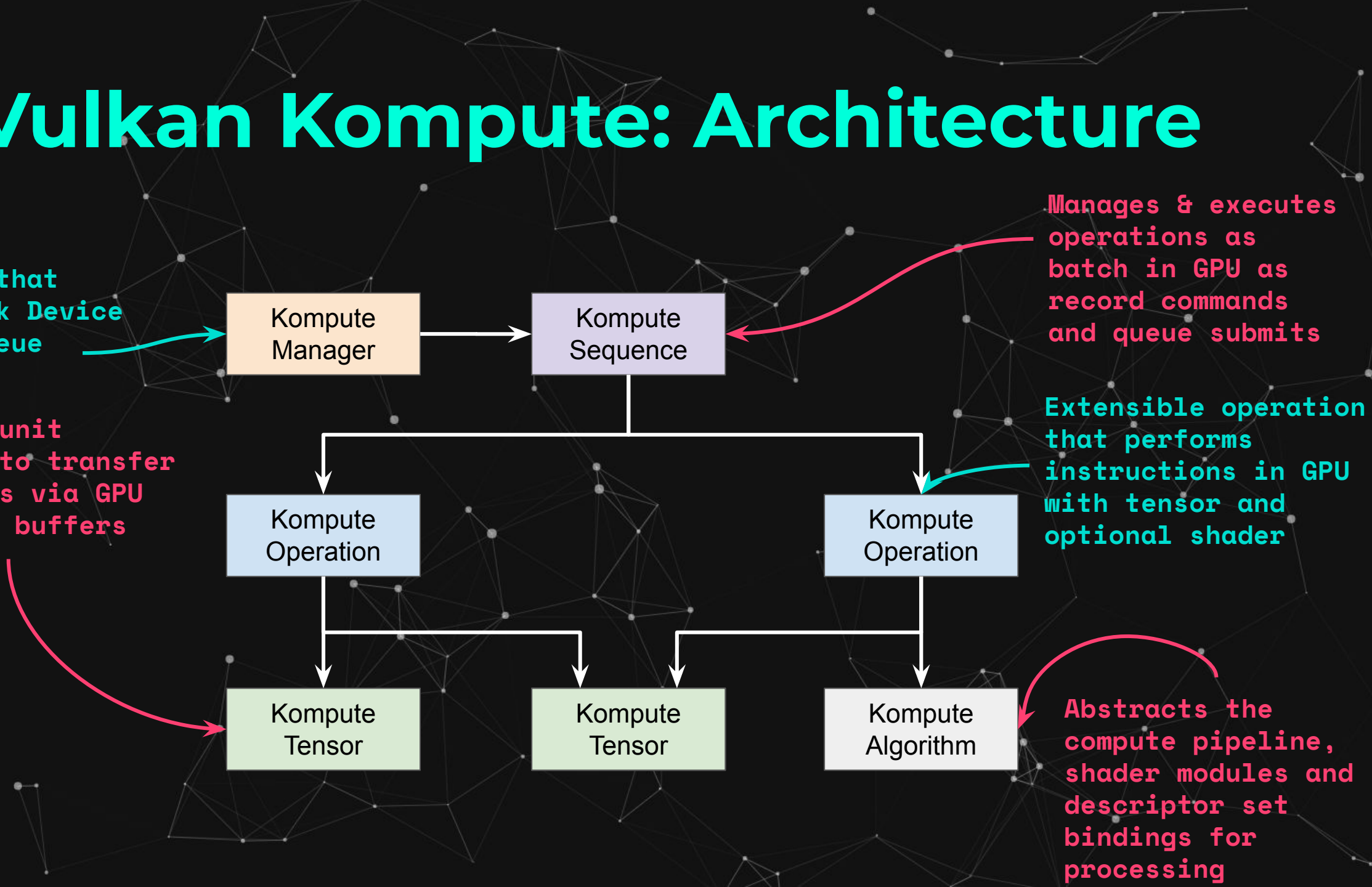
Extensible operation that performs instructions in GPU with tensor and optional shader

Kompute Tensor

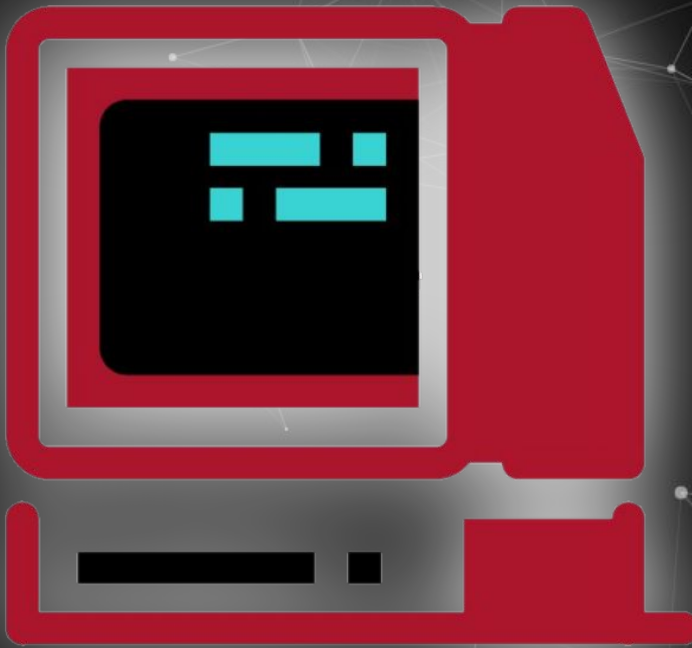
Kompute Tensor

Kompute Algorithm

Abstracts the compute pipeline, shader modules and descriptor set bindings for processing

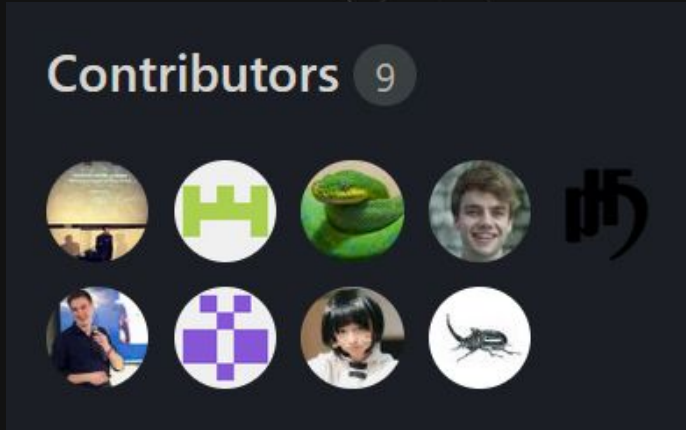


Kompute Mission



- Further the GPGPU ecosystem for scientific and industry applications through cross-vendor graphics card tooling and capabilities (across AMD, Qualcomm, NVIDIA & Friends)
- Foster ecosystem of parallel & distributed frameworks, standards and applications that enables for efficient and robust GPGPU
- Standardisation of underlying cross-vendor GPGPU computing across advanced data processing frameworks
- Enable high performance processing for GPU accelerated mobile and edge processing use-cases

Kompute Reach (1/3)

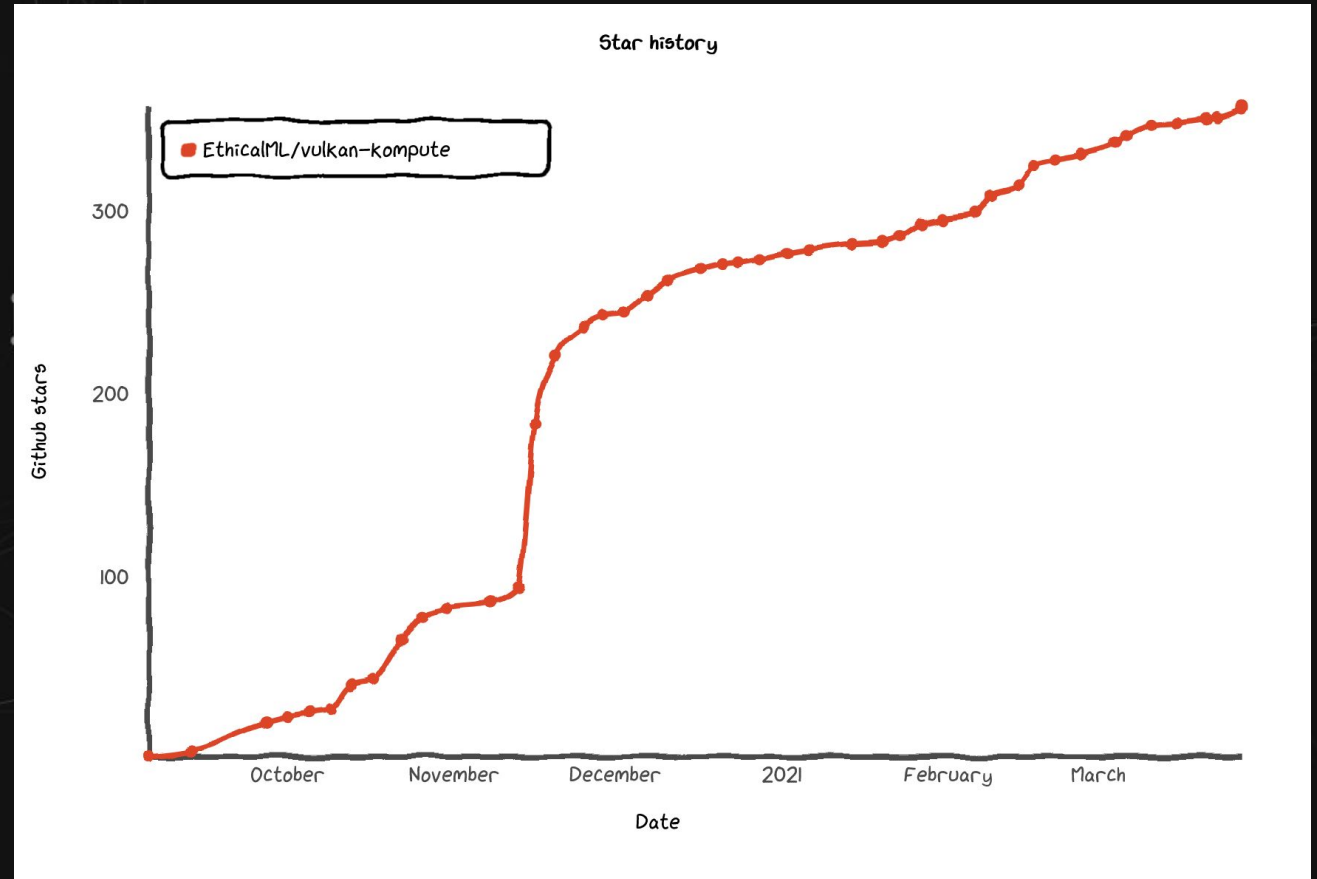


4 Main Contributors, 9 Total

Beyond CUDA: GPU Accelerated Python for Machine Learning on Cross-Vendor Graphics Cards Made Simple

A practical deep dive into GPU Accelerated Python on cross-vendor graphics cards (AMD, Qualcomm, NVIDIA & friends) building machine learning algorithms using the Vulkan Kompute Python Framework

Articles have 30k+ Views



Organic Popularity Growth

Kompute Reach (2/3)

vkJAX

JAX interpreter based on Vulkan Kompute

Minimal Example

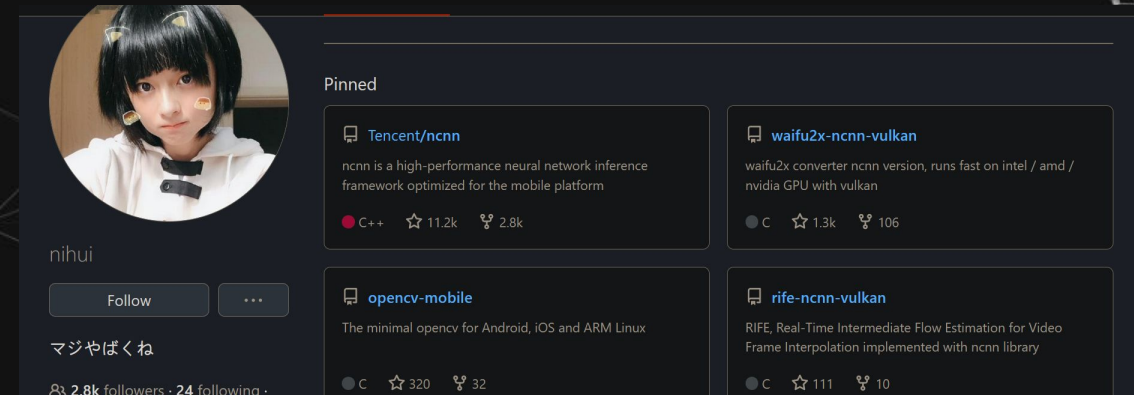
```
import numpy as np, jax.numpy as jnp
import vkjax

def jax_fun(x,W,b):
    return jnp.dot(x, W) + b

vkfun = vkjax.wrap(jax_fun)

#this runs on the GPU, powered by vulkan
y = vkfun(
    np.random.random([8,128]),
    np.random.random([128,16]),
    np.random.random([16])
)
```

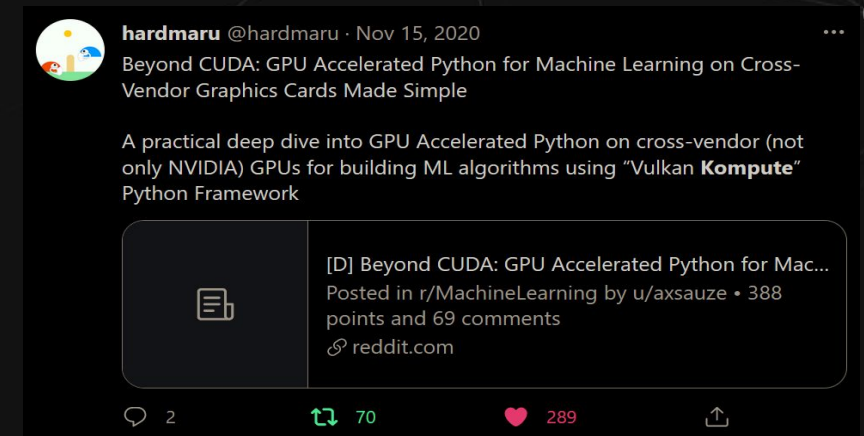
Backend for ML Libraries



GitHub profile for nihui (2.8k followers, 24 following). Pinned repositories include:

- Tencent/ncnn: ncnn is a high-performance neural network inference framework optimized for the mobile platform. 11.2k stars, 2.8k forks.
- waifu2x-ncnn-vulkan: waifu2x converter ncnn version, runs fast on intel / amd / nvidia GPU with vulkan. 1.3k stars, 106 forks.
- opencv-mobile: The minimal opencv for Android, iOS and ARM Linux. 320 stars, 32 forks.
- rife-ncnn-vulkan: RIFE, Real-Time Intermediate Flow Estimation for Video Frame Interpolation implemented with ncnn library. 111 stars, 10 forks.

Tencent NCNN Author Recognition



Reddit post by hardmaru (@hardmaru) from Nov 15, 2020. Title: Beyond CUDA: GPU Accelerated Python for Machine Learning on Cross-Vendor Graphics Cards Made Simple. The post is a practical deep dive into GPU Accelerated Python on cross-vendor (not only NVIDIA) GPUs for building ML algorithms using "Vulkan Kompute" Python Framework. It has 2 comments, 70 reposts, and 289 likes. A link to the post on reddit.com is provided.

Social Media Traction

Kompute Reach (3/3)



 Machine Learning Engineer → ...
Cytera CellWorks · London, England, United Kingdom
Posted 1 week ago · 179 views

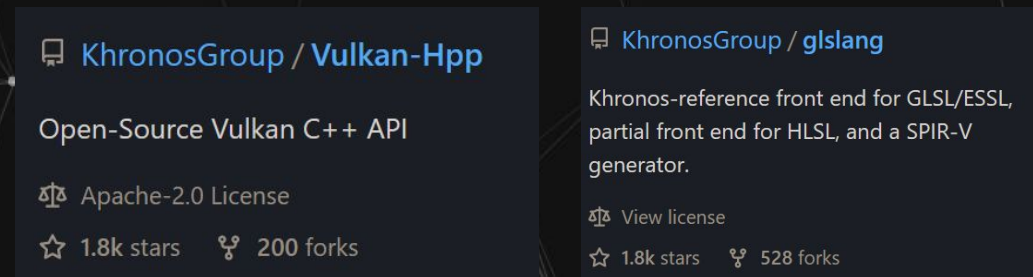
[Apply](#) [Save](#)

- The prospect of running some models on the edge excites you, including using GPU acceleration with tools such as CUDA or Vulkan Kompute.

We're building a team that enjoys moving fast and not killing cells, strives for continuous



Broad Community Collaboration



[KhronosGroup / Vulkan-Hpp](#)
Open-Source Vulkan C++ API
Apache-2.0 License
1.8k stars 200 forks

[KhronosGroup / glslang](#)
Khronos-reference front end for GLSL/ESSL, partial front end for HLSL, and a SPIR-V generator.
View license
1.8k stars 528 forks

Orgs. Hiring for Kompute Skill

Upstream Contributions

Potential of Kompute at LFAI



- Become the backend of large projects looking to integrate with Vulkan or add mobile capabilities
- Provide interoperability for applications to introduce GPGPU through higher level C++, Python, or other
- Enable edge processing capabilities through current capabilities in Android, IOS, Raspberry Pi, etc
- Build ecosystem of higher level tools for specialised functionality
- Serve as an anchor to the Khronos Group as LFAI has core DL/ML application

LF Project Collaborations



ONNX



Acumos AI



Angel



Milvus



KubeEdge

OpenYurt



kubernetes



mlflow™



Pyro



DELTA LAKE™



AI Fairness 360



AI Explainability 360



Adversarial
Robustness
Toolbox

LF Project Collaborations Detail

Project Name	Potential Collaboration Description
ADLIK	GPU for cross vendor graphics cards as well as edge and mobile integrations
ONNX	Extensions to the server for cross vendor GPU support
Acumos AI	Marketplace entry for deploying Kompute accelerated applications
Angel	Cross vendor GPU support (using a JNI interface extended from Android support)
Milvus	GPU for cross vendor graphics cards as well as edge and mobile integrations
KubeEdge	Integration for GPU support on edge device and examples
OpenYurt	Integration for GPU support on edge device and examples
Kubernetes	General initiative to add support for cross-vendor GPU integration

LF Project Collaborations Detail

Project Name	Potential Collaboration Description
MLFlow	Runtime / backend for exporting / deploying kompute accelerated algorithms
Pyro	Adding backend for GPU acceleration in cross-vendor GPUs
Deltalake	Cross vendor GPU Acceleration for data processing
RISC-V	Contributing from the compute perspective to the ongoing collaboration [link] towards fully open source GPU (or display adapter) to the hardware level
AI Fairness 360	Backend integration for GPU accelerated algorithms in cross-vendor GPUs
AI Explainability 360	Backend integration for GPU accelerated algorithms in cross-vendor GPUs
AI Adv Robustness	Backend integration for GPU accelerated algorithms in cross-vendor GPUs
Horovod	Example deploying Kompute powered application on non-standard GPU device

Vulkan Kompute

Linux Foundation Proposal for Vulkan Kompute as
Sandbox project focused on advancement of
cross-vendor GPGPU

Alejandro Saucedo

[@AxSaucedo](#)

IT'S BREATHTAKING.



The image features a complex network of white nodes and lines on a black background. The nodes are small circles, and the lines are thin, connecting the nodes in a web-like structure. The network is dense and irregular, with many interconnected nodes and lines. In the center of the image, the word "ANNEX" is written in a bold, cyan-colored, sans-serif font. The text is centered horizontally and vertically, and its color contrasts sharply with the black background and the white network lines.

ANNEX

Enter Vulkan Kompute (Simple Python Example)

```
# Create Kompute Manager  
mgr = Manager()  
sq = mgr.sequence()
```

```
sq.eval(kp.OpAlgoDispatch(  
    [t_a, t_b, t_out],  
    compute_shader_multiply.to_spirv()))
```

```
# Sync to CPU host memory  
sq.eval(kp.OpTensorSyncLocal(  
    [t_out]))
```

```
# Prints [2.0, 4.0, 6.0]  
print(t_out.data())
```

```
# Initialize tensors with List[] or np.Array  
t_a = mgr.tensor([2, 2, 2])  
t_b = mgr.tensor([1, 2, 3])  
t_out = mgr.tensor([0, 0, 0])  
  
sq.eval(kp.OpTensorSyncDevice([t_a, t_b, t_out]))
```

```
# Define the function via PyShader as glsl string / spirv bytes  
@python2shader  
def compute_shader_multiply(index=("input", "GlobalInvocationId",  
    ivec3),  
    buffer_a=("buffer", 0, Array(f32)),  
    buffer_b=("buffer", 1, Array(f32)),  
    buffer_out=("buffer", 2, Array(f32))):  
  
    i = index.x  
    buffer_out[i] = buffer_a[i] * buffer_b[i]
```

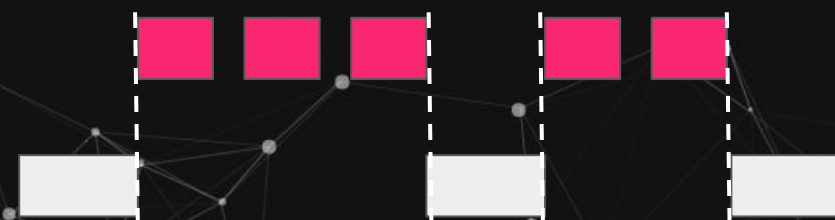
Deeper Optimizations

CPU

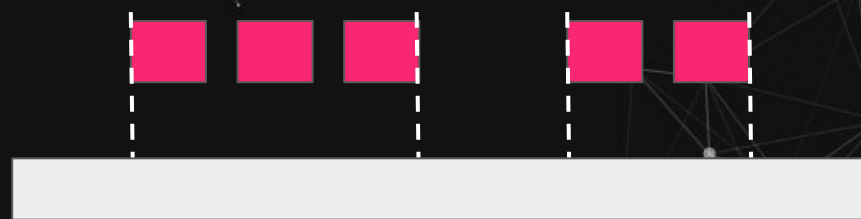
GPU



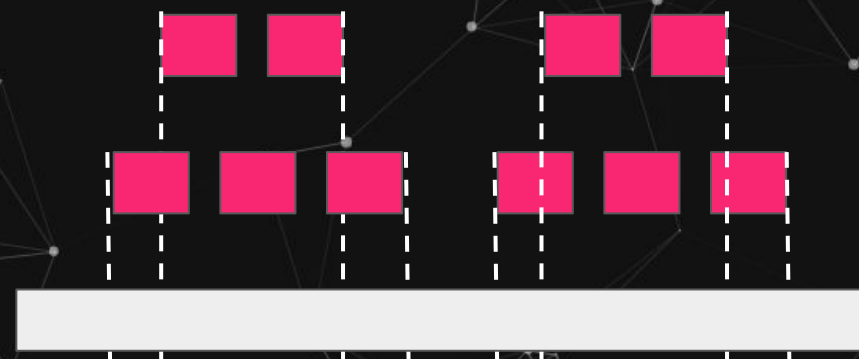
Run a single command/operation
in a sequence with manager



Reuse multiple sequences in same
Tensors with pre-recorded cmds



Asynchronous execution of
Sequences



Concurrent execution of
Sequences across GPU queues

Kompute ML Example

Kompute

1. Create **Tensors**
2. Initialise **Sequence** to init **Tensors**
3. Initialise **Sequence** to run **Algorithm** (with Shader)
4. Iterate 100 times to “learn” the parameter **Tensors** with learning rate
5. Print the learned parameter **Tensors**

Shader (GPU)

Input

$$\hat{y} = \sigma(W X^T + b)$$

Prediction

Parameters

The diagram shows the equation $\hat{y} = \sigma(W X^T + b)$ in pink. A cyan arrow labeled 'Input' points down to the X^T term. A cyan arrow labeled 'Prediction' points up to the \hat{y} term. Two cyan arrows labeled 'Parameters' point from below to the W and b terms.

LR Shader Logic

```
@ps.python2shader
def compute_shader(
    index = ("input", "GlobalInvocationId", ps.ivec3),
    x_i = ("buffer", 0, ps.Array(ps.f32)),
    x_j = ("buffer", 1, ps.Array(ps.f32)),
    y = ("buffer", 2, ps.Array(ps.f32)),
    w_in = ("buffer", 3, ps.Array(ps.f32)),
    w_out_i = ("buffer", 4, ps.Array(ps.f32)),
    w_out_j = ("buffer", 5, ps.Array(ps.f32)),
    b_in = ("buffer", 6, ps.Array(ps.f32)),
    b_out = ("buffer", 7, ps.Array(ps.f32)),
    l_out = ("buffer", 8, ps.Array(ps.f32)),
    M = ("buffer", 9, ps.Array(ps.f32))):

    i = index.x # Fetch the current run index

    m = M[0]
```

```
@ps.python2shader
def compute_shader(...):
    # ...
    w_curr = vec2(w_in[0], w_in[1])
    b_curr = b_in[0]

    x_curr = vec2(x_i[i], x_j[i])
    y_curr = y[i]

    z_dot = w_curr @ x_curr
    z = z_dot + b_curr
    y_hat = 1.0 / (1.0 + exp(-z))

    d_z = y_hat - y_curr
    d_w = (1.0 / m) * x_curr * d_z
    d_b = (1.0 / m) * d_z

    loss = -((y_curr * log(y_hat)) +
              ((1.0 + y_curr) * log(1.0 - y_hat)))

    w_out_i[i] = d_w.x
    w_out_j[i] = d_w.y
    b_out[i] = d_b
    l_out[i] = loss
```

Kompute Logic: Create Tensors

```
# First we create input and output tensors for shader
tensor_x_i = kp.Tensor([0.0, 1.0, 1.0, 1.0, 1.0])
tensor_x_j = kp.Tensor([0.0, 0.0, 0.0, 1.0, 1.0])

tensor_y = kp.Tensor([0.0, 0.0, 0.0, 1.0, 1.0])

tensor_w_in = kp.Tensor([0.001, 0.001])
tensor_w_out_i = kp.Tensor([0.0, 0.0, 0.0, 0.0, 0.0])
tensor_w_out_j = kp.Tensor([0.0, 0.0, 0.0, 0.0, 0.0])

tensor_b_in = kp.Tensor([0.0])
tensor_b_out = kp.Tensor([0.0, 0.0, 0.0, 0.0, 0.0])

tensor_l_out = kp.Tensor([0.0, 0.0, 0.0, 0.0, 0.0])

tensor_m = kp.Tensor([ tensor_y.size() ])

# We store them in an array for easier interaction
params = [tensor_x_i, tensor_x_j, tensor_y, tensor_w_in, tensor_w_out_i,
          tensor_w_out_j, tensor_b_in, tensor_b_out, tensor_l_out, tensor_m]
```

**Tensors will
be used as
buffers in
the GPU
shader code
created
earlier**

Kompute Logic: Init Tensors

```
mgr = kp.Manager(0)
```

```
mgr.eval_tensor_create_def(params)
```

**Create manager with Device 0 and
initialise all the Tensors**

Kompute Logic: Main Sequence

**Create
sequence
explicitly
by recording
multiple
batch
commands
efficiently**

```
# Create a managed sequence
sq = mgr.create_sequence()

# Clear previous operations and begin recording for new operations
sq.begin()

# Record operation to sync memory from local to GPU memory
sq.record_tensor_sync_device([tensor_w_in, tensor_b_in])

# Record operation to execute GPU shader against all our parameters
sq.record_algo_data(params, compute_shader.to_spirv())

# Record operation to sync memory from GPU to local memory
sq.record_tensor_sync_local(
    [tensor_w_out_i, tensor_w_out_j, tensor_b_out, tensor_l_out])

# Stop recording operations
sq.end()
```

Kompute Logic: “Learn” LR Params

```
ITERATIONS = 100
learning_rate = 0.1

# Perform ML training and inference across all input X and Y
for i_iter in range(ITERATIONS):

    # Execute an iteration of the algorithm
    sq.eval()

    # Calculate the parameters based on the respective derivatives
    for j_iter in range(tensor_b_out.size()):
        tensor_w_in[0] -= learning_rate * tensor_w_out_i.data()[j_iter]
        tensor_w_in[1] -= learning_rate * tensor_w_out_j.data()[j_iter]
        tensor_b_in[0] -= learning_rate * tensor_b_out.data()[j_iter]
```

**Iterate 100
times
updating the
learned
parameters
using the
learning
rate of 0.1**

Kompute Logic: Print LR Params

Finally print the learned parameters which represent our “trained model” and can be used to predict unseen datapoints

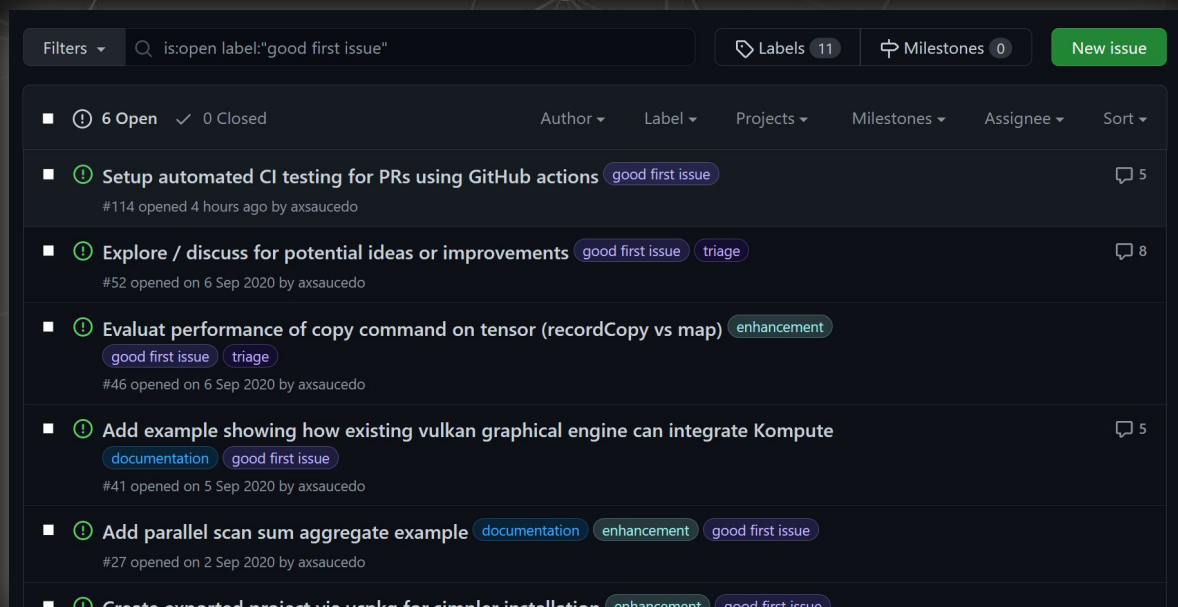
```
# Prints ~< 0.01
print(tensor_w_in.data()[0])

# Prints ~> 1.5
print(tensor_w_in.data()[1])

# Prints ~< 0.7
print(tensor_b_in.data()[0])
```

Get Involved!

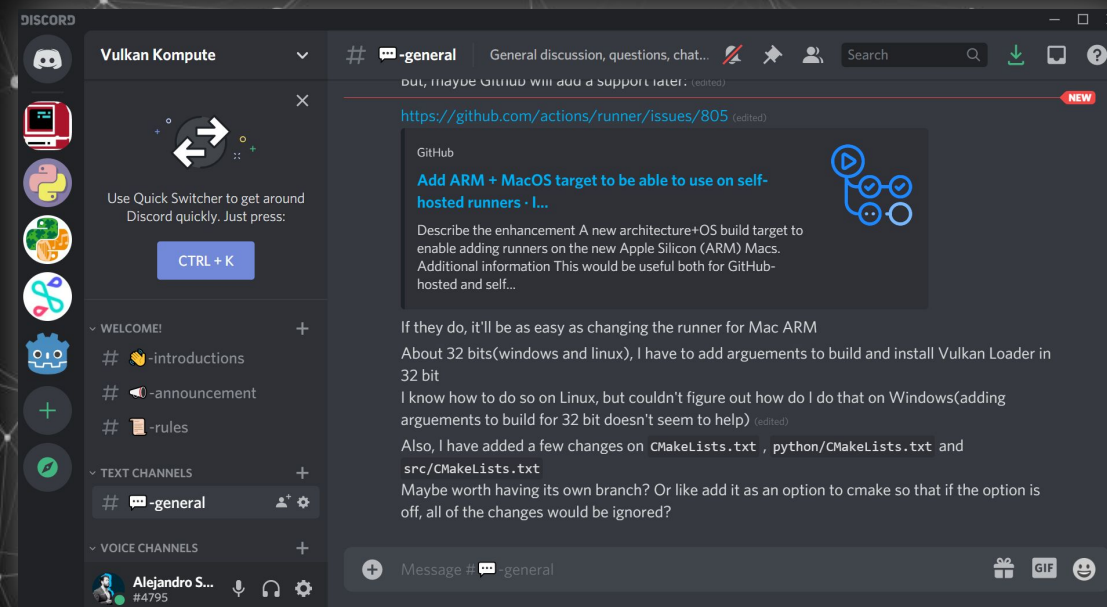
github.com/EthicalML/vulkan-kompute



Filters Labels 11 Milestones 0 [New issue](#)

6 Open 0 Closed Author Label Projects Milestones Assignee Sort

- Setup automated CI testing for PRs using GitHub actions [good first issue](#) 5
#114 opened 4 hours ago by axsaucedo
- Explore / discuss for potential ideas or improvements [good first issue](#) [triage](#) 8
#52 opened on 6 Sep 2020 by axsaucedo
- Evaluat performance of copy command on tensor (recordCopy vs map) [enhancement](#) [good first issue](#) [triage](#) 5
#46 opened on 6 Sep 2020 by axsaucedo
- Add example showing how existing vulkan graphical engine can integrate Kompute [documentation](#) [good first issue](#) 5
#41 opened on 5 Sep 2020 by axsaucedo
- Add parallel scan sum aggregate example [documentation](#) [enhancement](#) [good first issue](#) 5
#27 opened on 2 Sep 2020 by axsaucedo
- Create exported project via vcnk for simpler installation [enhancement](#) [good first issue](#)



DISCORD Vulkan Kompute # -general General discussion, questions, chat... Search

but, maybe github will add a support later. (edited)

<https://github.com/actions/runner/issues/805> (edited) **NEW**

GitHub

Add ARM + MacOS target to be able to use on self-hosted runners · L...

Describe the enhancement A new architecture+OS build target to enable adding runners on the new Apple Silicon (ARM) Macs. Additional information This would be useful both for GitHub-hosted and self...

If they do, it'll be as easy as changing the runner for Mac ARM

About 32 bits(windows and linux), I have to add arguements to build and install Vulkan Loader in 32 bit

I know how to do so on Linux, but couldn't figure out how do I do that on Windows(adding arguements to build for 32 bit doesn't seem to help) (edited)

Also, I have added a few changes on CMakeLists.txt , python/CMakeLists.txt and src/CMakeLists.txt

Maybe worth having its own branch? Or like add it as an option to cmake so that if the option is off, all of the changes would be ignored?

Message # -general

Pick up one of the
good-first-issues

Join the
discord chat

High level Roadmap

Integrate as backend of ML / scientific-computing frameworks

Create more default `kp::Operations` to have out of the box commands

Examples running Kompute across other platforms and frameworks

Vulkan Kompute

Linux Foundation Proposal for Vulkan Kompute as
Sandbox project focused on advancement of
cross-vendor GPGPU

Alejandro Saucedo

[@AxSaucedo](#)

IT'S BREATHTAKING.



Project Contribution Proposal Review & Discussion: Vulcan Kompyte

General purpose GPU compute framework for cross vendor graphics cards (AMD, Qualcomm, NVIDIA & friends). Blazing fast, mobile-enabled, asynchronous and optimized for advanced GPU data processing usecases. Typical usecases are: General Purpose GPU Computing, Develop GPU accelerated kernels for advanced data processing use-cases, Extend scientific applications to enable for mobile and cross vendor GPU support.

Presenter: Alejandro Saucedo <axsauze@gmail.com>

Resources:

Github: <https://github.com/EthicalML/vulkan-kompute>

Project Level: Sandbox

Proposal: <https://github.com/lfai/proposing-projects/pull/40/commits/cf502f741f045ee3ffe080165ef5c3b550a2fc40>

TAC Vote on Project Proposal: Vulcan Kompute

Proposed Resolution:

The TAC approves the Vulcan Kompute as a Sandbox project of the LF AI & Data Foundation

Next Steps

LF AI & Data staff will work with Vulcan Kompute to onboard the project leading to the announcement of the project joining LF AI & Data

Explore potential integrations between the sandbox project and other LF AI & Data projects

Integrate the sandbox project with LF AI & Data operations

LF AI & Data - General Updates

 LF AI & DATA

Machine Learning	Framework	Platform	Library	Framework	Platform	Library	Tool	Reinforcement Learning	Programming
	<p>Graduated</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Graduated</p>

Notebook Environment	Store & Format	Versioning	Operations	Feature Engineering	Stream Processing	SQL Engine	Visualization	Pipeline Management	Labeling & Annotation	Governance
	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Graduated</p>	




Model	Inference	Benchmarking	Training	Parameter	Format & Interface	Marketplace	Workflow	Tool	Explainability	Adversarial	Bias & Fairness
	<p>Incubating</p>	<p>Incubating</p>	<p>Graduated</p>	<p>Graduated</p>	<p>Graduated</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>









Distributed Computing	Computing & Management	Interface	Security & Privacy	Natural Language Processing	Education
	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>	<p>Incubating</p>










The LF AI & Data landscape explores open source projects in Artificial Intelligence and their sub-respective domains.

lfaidata.foundation

LF AI & DATA Landscape

Machine Learning	Framework	Platform	Library	Framework	Platform	Library	Tool	Reinforcement Learning	Programming
		 Graduated  Incubating							 Graduated

Notebook Environment	Store & Format	Versioning	Operations	Feature Engineering	Stream Processing	SQL Engine	Visualization	Pipeline Management	Labeling & Annotation	Governance
		 Incubating  Incubating		 Incubating  Incubating  Incubating  Incubating	 Incubating					 Graduated

Model	Inference	Benchmarking	Training	Parameter	Format & Interface	Marketplace	Workflow	Tool	Explainability	Adversarial	Bias & Fairness
	 Incubating		 Graduated  Incubating		 Graduated	 Graduated	 Incubating		 Incubating	 Incubating	 Incubating

Distributed Computing	Computing & Management	Interface	Security & Privacy				Natural Language Processing	Education
	 Incubating  Incubating	 Incubating	 <p>The LF AI & Data landscape explores open source projects in Artificial Intelligence and Data and their respective domains.</p> 				 Incubating  Sandbox	 Incubating  Incubating

2020 TAC Meetings Summary

Jan Feb Mar	16: Milvus (Zilliz)*	13: <i>MLOps Work (LF CD)</i> 27: <i>Collective Knowledge (Coral Reef)</i>	12: NNStreamer (Samsung)* 26: ForestFlow (?)*
Apr May Jun	9: <i>Trusted AI & ML Workflow (LF)</i> 23: <i>Open Data Hub (Red Hat)</i>	7: Ludwig (Uber)* 21: <i>SnapML (IBM)</i>	4: <i>Trusted AI (AI for Good, Ambianic.ai, MAIEI)</i> 18: Fairness, Explainability, Robustness (IBM)*
Jul Aug Sep	16: <i>Mindspore (Huawei)</i> 30: Amundsen (Lyft)*	16: <i>Delta (Didi)</i> 16: Horovod (Uber/LF)** 30: <i>ModelDB (?)</i> 30: <i>Egeria, OpenDS4All, BI&AI (LF ODPI)</i>	10: SOAJS (HeronTech)* 10: Delta (Didi)* 24: FEAST (Gojek)* 24: Egeria, (LF ODPI)** 24: OpenDS4All (ODPI)* 24: BI&AI Committee (ODPI)
Oct Nov Dec	8: <i>Fairness, Explainability, Robustness (LF)</i> 22: <i>OpenLineage (DataKins)</i> 22: <i>IDA (IBM/Salesforce)</i>	5: DataPractices.Org (WorldData/LF)* 5: <i>Kubeflow-On-Prem (Google, Arrikto/Intel)</i> 19: <i>OpenDS4All, DataPractices.Org, edX Ethical AI (LF)</i>	3: TBD - JanusGraph (LF)* 3: <i>TBD - RosaeGL (?)</i> 17: TBD – Seldon Core (Seldon)* 17: TBD – Pyro (Uber/LF)**

(Entity)* = incubating vote

**** bold = graduate vote**

Italics = invited project presentation

2021 TAC Meetings Pipeline Summary

Jan Feb Mar	14: Datashim(IBM)* 28: Project Lifecycle Stages vote Invited talks Sedna & CIM	11: Invited talks Egeria CI & Mentorships 25: Flyte (Lyft) *	11: RosaeNLG () Sandbox Proposal Invited talk Elyra-AI (IBM) 25: Substra Framework (Substra)*
Apr May Jun	8: Invited talk JINAAI 22: Egeria & OpenDS4All - project update	6: ML eXchange (MLX) (IBM) Sandbox Vulcan Kompute () Sandbox 20: OpenLineage (Datakin) Sandbox	3: KOSA.ai 17: GSI
Jul Aug Sep	1: Canceled for holiday 15: TonY (Linkedin)	5: TBD - Project updates 19: TBD - Project updates	?: Open Data Hub (Red Hat) ? Ray (Anyscale.io) ?: Pachyderm (Pachyderm) ?: DataHub (LinkedIn) ?: Kubeflow-On-Prem (Google, Arrikto, Intel)
Oct Nov Dec	?: Vespa (Verizon Media) ?: KubeflowServing (Google, Arrikto, Seldon) ?: Kubeflow Pipeline (Google, Bloomberg) ?: Common Knowledge (Code Reef) ?: Couler (Ant Financial)	?: Snorkle (Snorkle) ?: Plotly (DASH) ?: Melody (Substra) ?: mloperator (Polyaxen) ?: SnapML (IBM)	?: PMML/PFA (DMG.org) ?: Mindspore, Volcano (Huawei) ?: TransmorgrifAI (Salesforce) ?: AIMET (Qualcomm) ?: Elyra-AI (IBM)

(Entity)* = incubating vote

** **bold** = graduate vote






Italics = invited project presentation

Getting to know the projects more





















Projects (28)

<https://landscape.lfai.foundation/card-mode?project=company>


Graduated LF AI & Data Projects (6)

 Acumos ★ 15 LF AI & Data Foundation	 Angel ★ 6,149 LF AI & Data Foundation	 Egeria ★ 326 LF AI & Data Foundation	 Horovod ★ 10,913 LF AI & Data Foundation	 ONNX ★ 9,871 LF AI & Data Foundation	 Pyro ★ 6,784 LF AI & Data Foundation
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Incubating LF AI & Data Projects (20)

 ADLIK ★ 237 LF AI & Data Foundation	 Adversarial Robustness Toolkit ★ 2,054 LF AI & Data Foundation	 AI Explainability 360 Toolkit ★ 782 LF AI & Data Foundation	 AI Fairness 360 Toolkit ★ 1,246 LF AI & Data Foundation	 Amundsen ★ 1,864 LF AI & Data Foundation	 DataPractices ★ 10 LF AI & Data Foundation	 datashim ★ 79 LF AI & Data Foundation	 DELTA ★ 1,394 LF AI & Data Foundation	 EDL ★ 125 LF AI & Data Foundation	 FEAST ★ 1,539 LF AI & Data Foundation
 Flyte ★ 1,217 LF AI & Data Foundation	 ForestFlow ★ 43 LF AI & Data Foundation	 JanusGraph ★ 3,869 LF AI & Data Foundation	 LUDWIG ★ 7,587 LF AI & Data Foundation	 MARQUEZ ★ 518 LF AI & Data Foundation	 Milvus ★ 5,259 LF AI & Data Foundation	 NNStreamer ★ 325 LF AI & Data Foundation	 OpenDS4All ★ 238 LF AI & Data Foundation	 SOAJS ★ 43 LF AI & Data Foundation	 sparklyr ★ 775 LF AI & Data Foundation

Sandbox LF AI & Data Projects (1)

 RosaeNLG ★ 12 LF AI & Data Foundation
--

* Missing Substra Framework (pending logo redesign)

New projects in 2021

1. **Datashim:** Open source enablement and acceleration of data access for Kubernetes/OpenShift workloads in a transparent and declarative way
2. **Flyte:** Production-grade, declarative, structured and highly scalable cloud-native workflow orchestration platform
3. **RosaeNLG:** Open source project, template-based Natural Language Generation (NLG) automating the production of relatively repetitive texts based on structured input data and textual templates, run by a NLG engine
4. **Substra Framework:** Low-layer framework, offering secure, traceable, distributed orchestration of machine learning tasks among partners.

→ Track incoming proposals via: <https://github.com/lfai/proposing-projects>

Active and growing developer community

Cumm. Jan 1- Dec 31, 2020 vs. Jan 1, 2020 to Apr 2, 2021

8.92K

Contributors

+7.25%

34.65K

PRs/Changesets

+7.21%

100.03K

Commits

+11.03%

22.54K

Total issues

+5.19%

358

Repositories

+3.07%

2.08K

Slack messages

+68.75%

9.61K

Contributors

37.15K

PRs/Changesets

111.07K

Commits

23.71K

Total issues

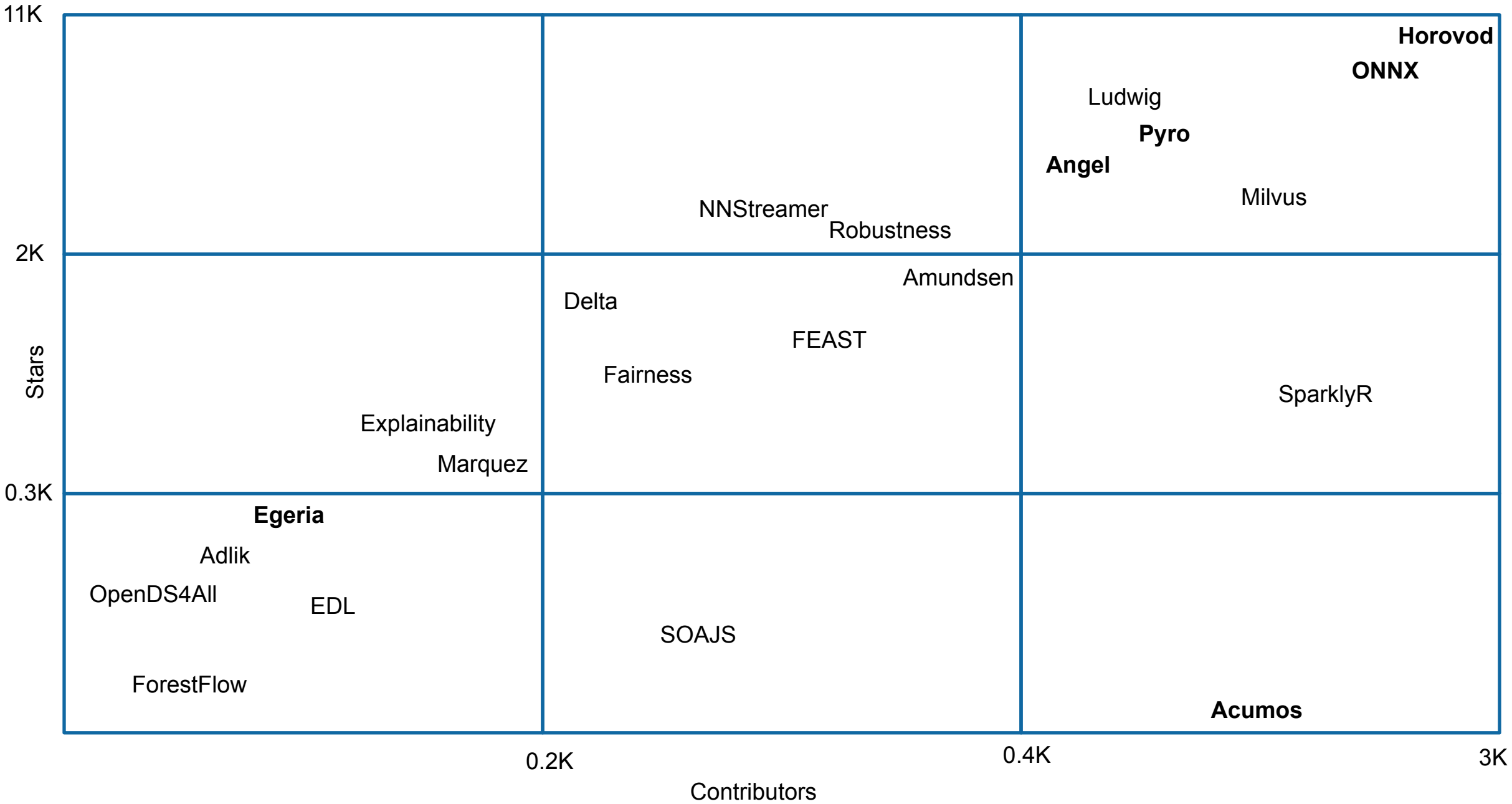
369

Repositories

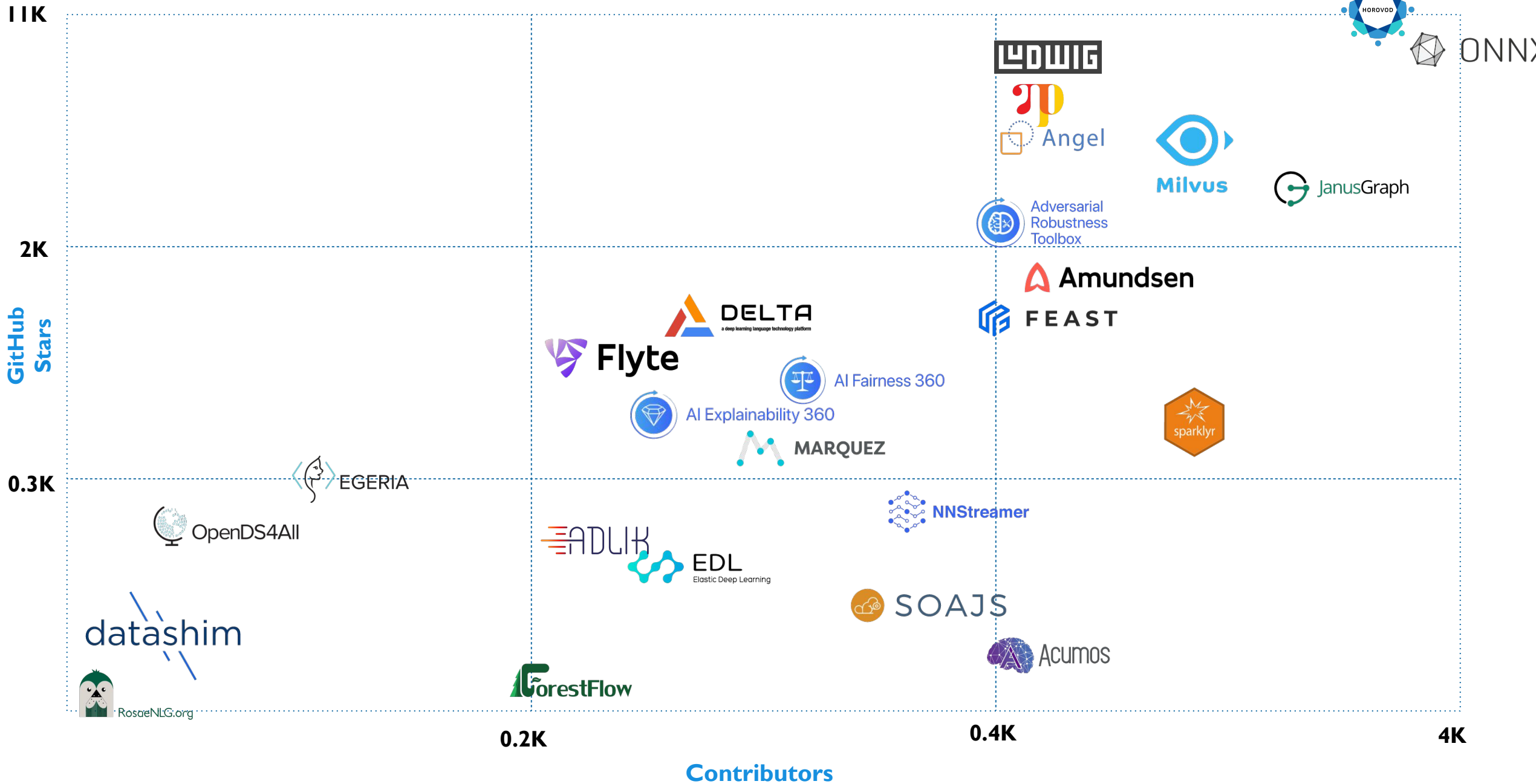
3.51K

Slack messages

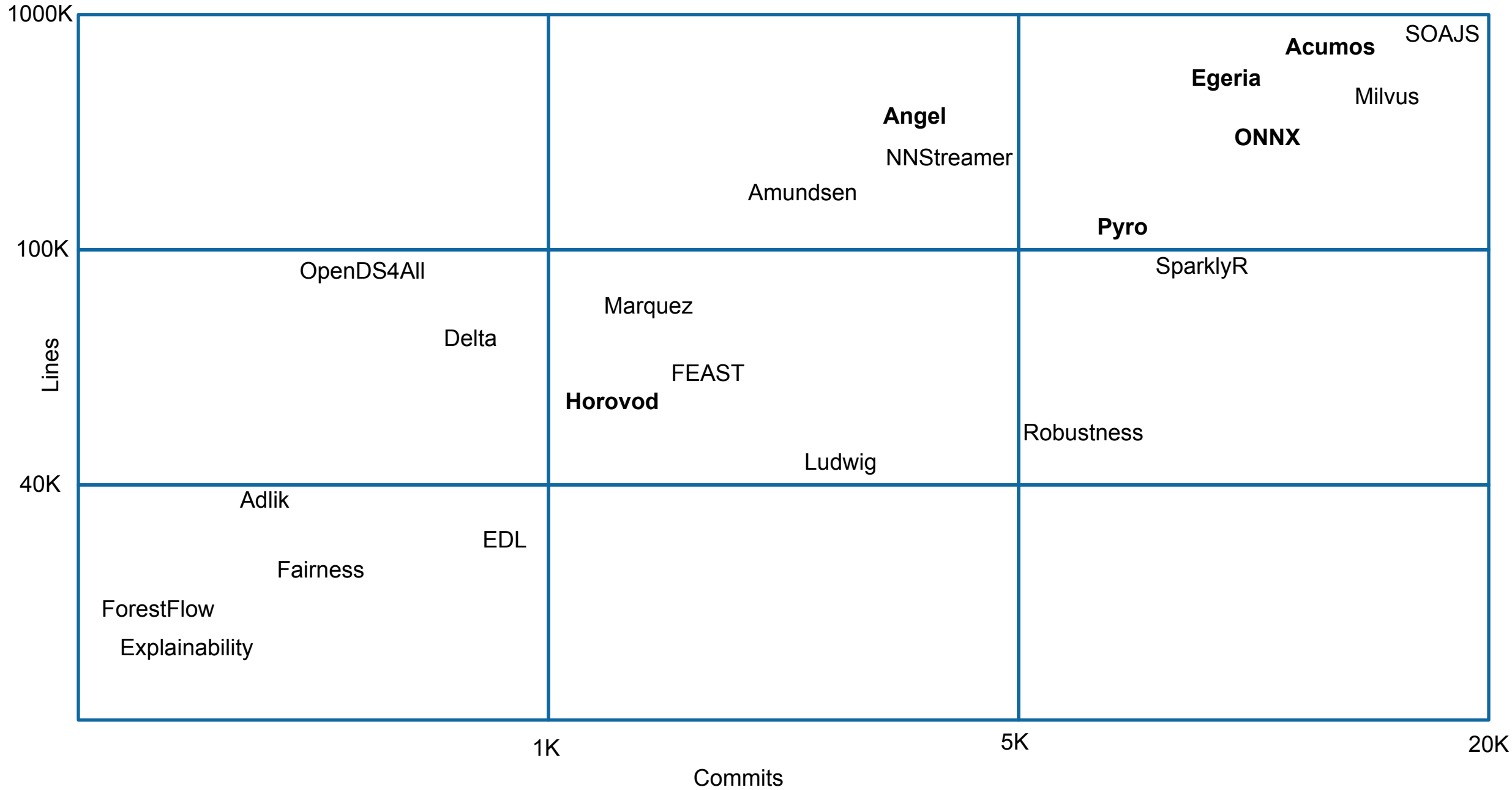
Data from November 23, 2020 – Stars and Contributors



Data Coverage (Mar 19, 2021) - Stars and Contributors



Data from November 23, 2020 – Lines of Code and Commits



Data Coverage (Mar 19, 2021) - Line of Code and Commits



Looking to host a project with LF AI & Data

- › Hosted project stages and life cycle:

<https://lfaidata.foundation/project-stages-and-lifecycle/>

- › Offered services for hosted projects:

<https://lfaidata.foundation/services-for-projects/>

- › Contact:

Jim Spohrer (TAC Chair) and Ibrahim Haddad (ED, LF AI & Data)

Promoting Upcoming Project Releases

We promote project releases via a blog post and on LF AI & Data [Twitter](#) and/or [LinkedIn](#) social channels

For links to details on upcoming releases for LF AI & Data hosted projects visit the [Technical Project Releases wiki](#)

If you are an LF AI & Data hosted project and would like LF AI & Data to promote your release, reach out to pr@lfai.foundation to coordinate in advance (min 2 wks) of your expected release date.

Note on quorum

As LF AI & Data is growing, we now have 18 voting members on the TAC.

TAC representative - please ensure you attend the bi-weekly calls or email Jacqueline/Ibrahim to designate an alternate representative when you can not make it.

We need to ensure quorum on the calls especially when we have items to vote on.

Updates from Outreach Committee

Upcoming Events

- › Upcoming Events
 - › Visit the [LF AI & Data Events Calendar](#) or the [LF AI & Data 2021 Events wiki](#) for a list of all events
 - › To participate visit the [LF AI & Data 2021 Events wiki page](#) or email info@lfaidata.foundation

- › Please consider holding virtual events

To discuss participation, please email events@lfaidata.foundation

Upcoming Events

<https://lfaidata.foundation/events/>

- **Kubernetes AI Day (virtual) - May 4th - [Event Website](#)**
 - a. Booth
- **OSS Global (hybrid) - Seattle, WA, USA - Sept 27-30 - [Event Website](#)**
 - a. Mini-Summit, Booth, Track

LF AI PR/Comms

- › Please follow LF AI & Data on [Twitter](#) & [LinkedIn](#) and help amplify news via your social networks - Please retweet and share!
 - › Also watch for news updates via the tac-general mail list
 - › View recent announcement on the [LF AI & Data Blog](#)
- › Open call to publish project/committee updates or other relevant content on the [LF AI & Data Blog](#)
- › To discuss more details on participation or upcoming announcements, please email pr@lfaidata.foundation

Call to Participate in Ongoing Efforts

 **OLF** AI & DATA

Trusted AI

- › **Leadership:**
Animesh Singh (IBM), Souad Ouali (Orange), and Jeff Cao (Tencent)
- › **Goal:** Create policies, guidelines, tooling and use cases by industry
- › **Slack conversation channel:**
#trusted-ai-committee
<https://lfaifoundation.slack.com/archives/CPS6Q1E8G>
- › **Github:**
<https://github.com/lfai/trusted-ai>
- › **Wiki:**
<https://wiki.lfai.foundation/display/DL/Trusted+AI+Committee>
- › **Email lists:**
<https://lists.lfaidata.foundation/g/trustedai-committee/>
- › **Next call:** Monthly alternating times
<https://wiki.lfai.foundation/pages/viewpage.action?pageId=12091895>

ML Workflow & Interop

- › **Leadership:**
Huang “Howard” Zhipeng (Huawei)
- › **Goal:**
Define an ML Workflow and promote cross project integration
- › **Slack conversation channel:**
#ml-workflow
<https://lfaifoundation.slack.com/archives/C011V9VSMQR>
- › **Wiki:**
<https://wiki.lfaidata.foundation/pages/viewpage.action?pageId=10518537>
- › **Email lists:**
<https://lists.lfaidata.foundation/g/mlworkflow-committee>
- › **Next call:** Monthly check calendar/slack
<https://wiki.lfai.foundation/pages/viewpage.action?pageId=18481242>

BI & AI

- › **Leadership:**
Cupid Chan (Index Analytics)
- › **Goal:** Identify and share industry best practices that combine the speed of machine learning with human insights to create a new business intelligence and better strategic direction for your organization.

- › **Slack conversations channel:**
#bi-ai-committee
<https://lfaifoundation.slack.com/archives/C01EK5ND073>
- › **Github:**
<https://github.com/odpi/bi-ai>
- Wiki:**
<https://wiki.lfaidata.foundation/pages/viewpage.action?pageId=35160417>
- Email lists:**
<https://lists.lfaidata.foundation/g/biai-discussion>
- Next call:** Monthly community call TBD

Ongoing effort to create AI Ethics Training

Initial developed course by the LF: Ethics in AI and Big Data - published on edX platform:

<https://www.edx.org/course/ethics-in-ai-and-big-data>

The goal is to build 2 more modules and package all 3 as a professional certificate - a requirement for edX

- › **To participate:**
<https://lists.lfaidata.foundation/g/aiethics-training>

Upcoming TAC Meetings

Upcoming TAC Meetings (Tentative)

- › May 20: Julien Le Dem & Mandy Chessell “Open Lineage” sandbox proposal
- › Jun 3: KOSA.ai
- › June 17: GSI invited presentation
- › July 1: Canceled Holiday
- › July 15: TonY (LinkedIn)
- › Aug 5: TBD - Annual project review
- › Aug 19: TBD - Annual project review

›

Please send agenda topic requests to
tac-general@lists.lfaidata.foundation

TAC Meeting Details

- › To subscribe to the TAC Group Calendar, visit the wiki: <https://wiki.lfaidata.foundation/x/cQB2>
- › Join from PC, Mac, Linux, iOS or Android: <https://zoom.us/j/430697670>
- › Or iPhone one-tap:
 - › US: +16465588656,,430697670# or +16699006833,,430697670#
- › Or Telephone:
 - › Dial(for higher quality, dial a number based on your current location):
 - › US: +1 646 558 8656 or +1 669 900 6833 or +1 855 880 1246 (Toll Free) or +1 877 369 0926 (Toll Free)
- › Meeting ID: 430 697 670
- › International numbers available: <https://zoom.us/u/achYtcw7uN>

Open Discussion

Mission

To build and support an open community and a growing ecosystem of open source AI, data and analytics projects, by accelerating innovation, enabling collaboration and the creation of new opportunities for all the members of the community

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