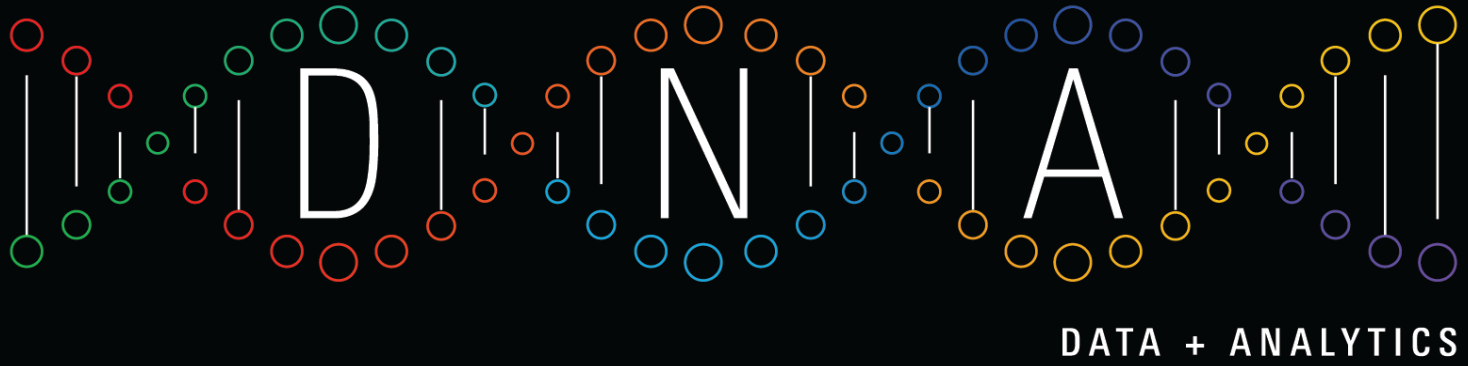



# Analytics Lab and Starflow

Jinyoung Kim
Head of Development, Analytics Platform
Morningstar, Inc.

MORNINGSTAR®

# Vision Inspiration

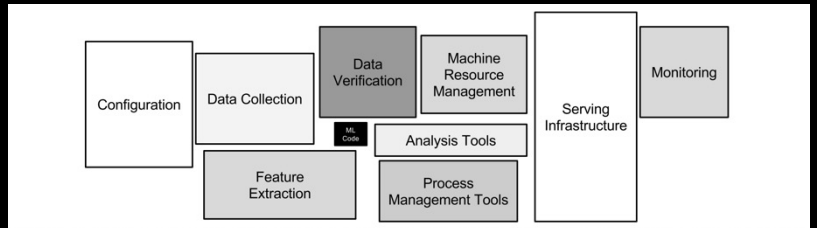
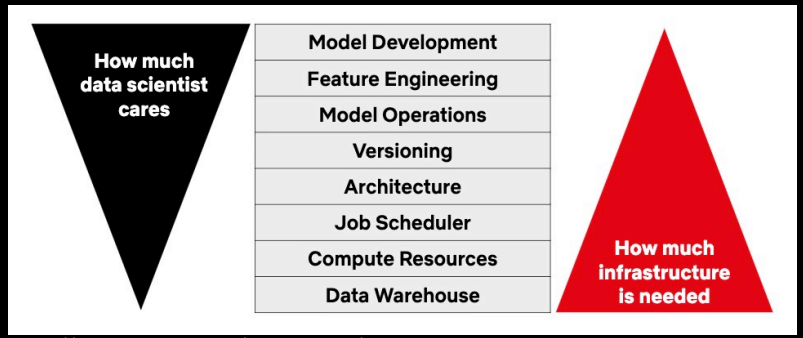



Figure 1: Only a small fraction of real-world ML systems is composed of the ML code, as shown by the small black box in the middle. The required surrounding infrastructure is vast and complex.

https://papers.nips.cc/paper/5656-hidden-technical-debt-in-machine-learning-systems.pdf




https://docs.metaflow.org/introduction/what-is-metaflow

# Frameworks

"How do you build your webapp?"

**2000**





**2004**





**2008**






**2015**



# Data/ML Frameworks

"How do you build your models?"

**2013**


**2015**


**2019**

# Frameworks + Platform as a Service


+


STARFLOW + Analytics Platform

# Starflow App Example

## Flask

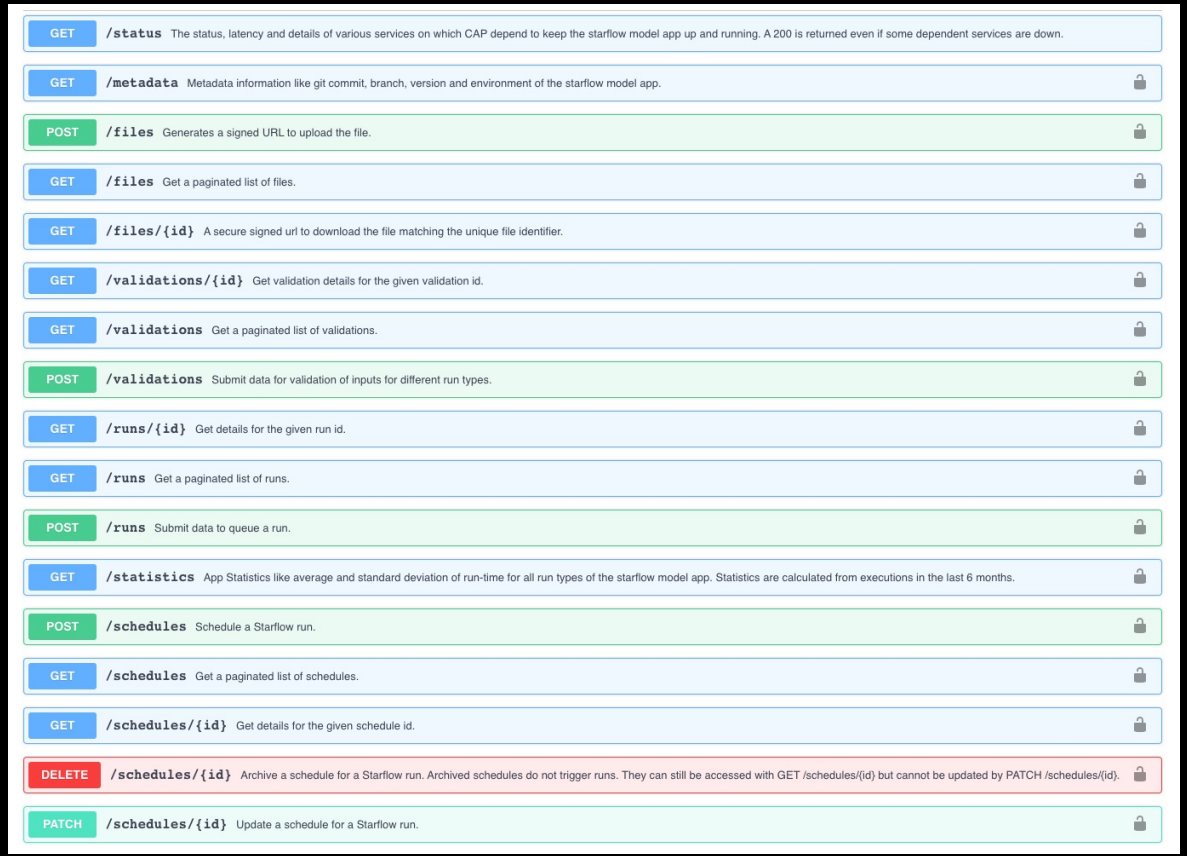
Flask is a lightweight WSGI web application framework. It is designed to make getting started quick and easy, with the ability to scale up to complex applications. It began as a simple wrapper around Werkzeug and Jinja and has become one of the most popular Python web application frameworks.

Flask offers suggestions, but doesn't enforce any dependencies or project layout. It is up to the developer to choose the tools and libraries they want to use. There are many extensions provided by the community that make adding new functionality easy.

```python
from flask import Flask, escape, request

app = Flask(__name__)

@app.route('/')
def hello():
    name = request.args.get("name", "World")
    return f'Hello, {escape(name)}!'
```

```python
from typing import Dict, Any
import starflow

app = starflow.App()

@app.run(run_type='add')
def add(x: int, y: int) -> Dict[str, Any]:
    return {"sum": x+y}
```

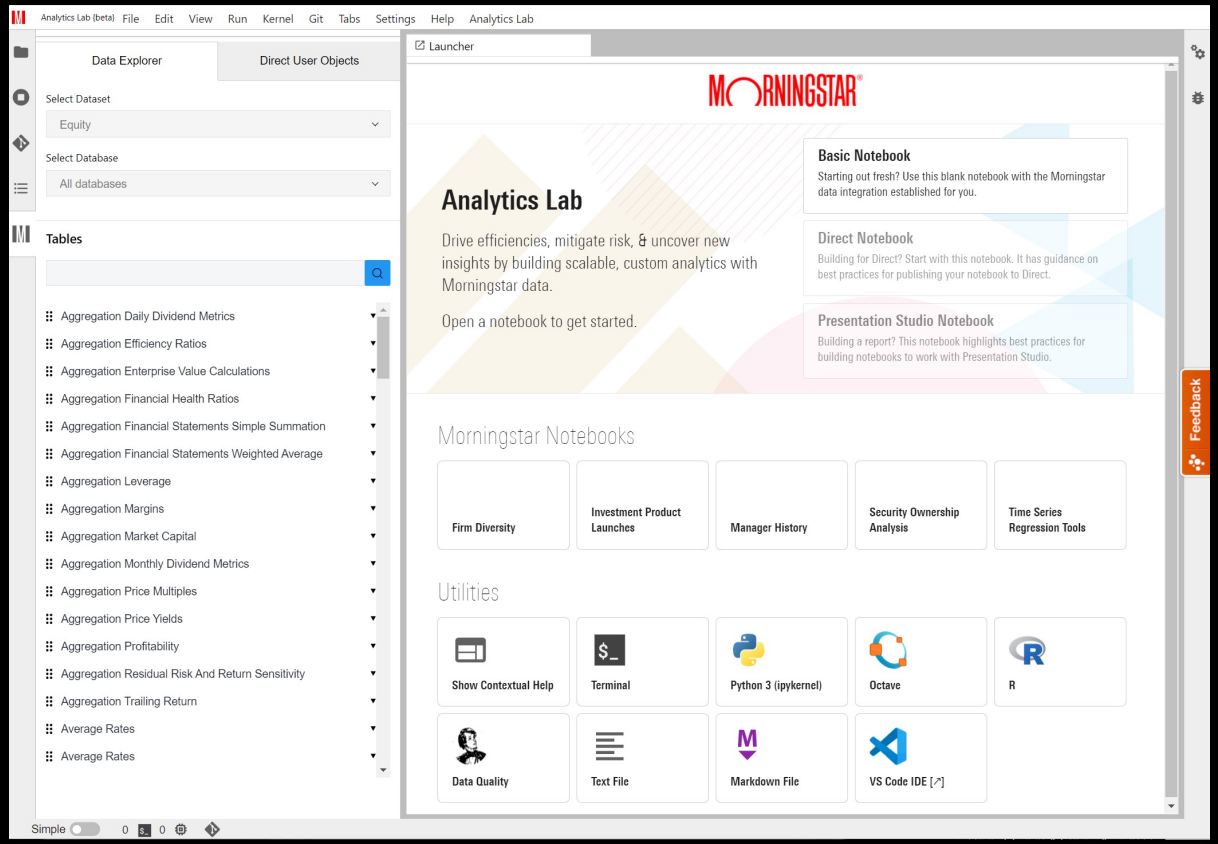
# Starflow API (Use Model)



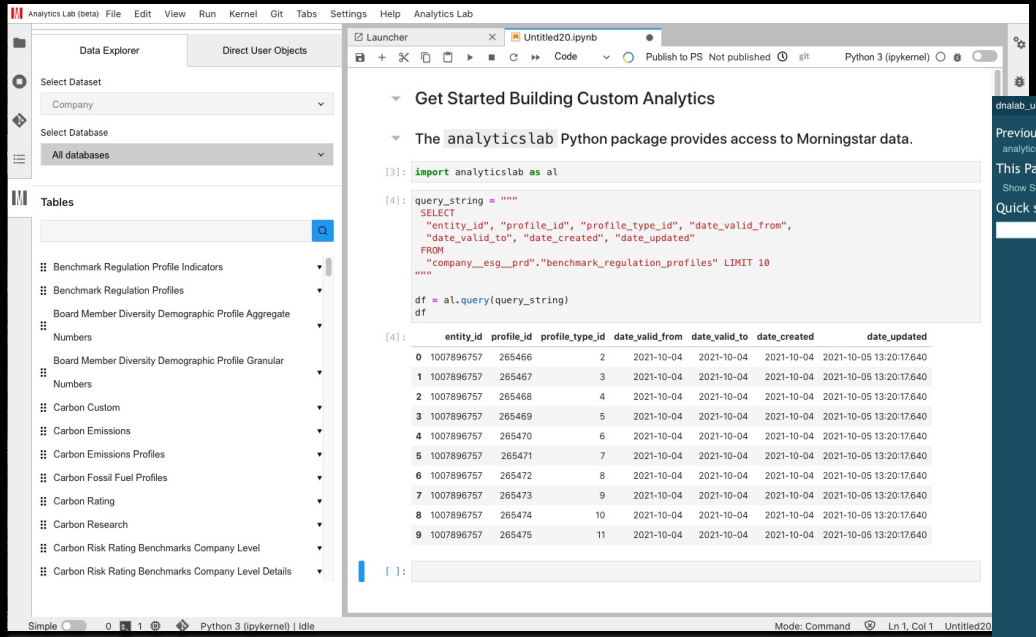
# Starflow App Management API (Deploy Model)

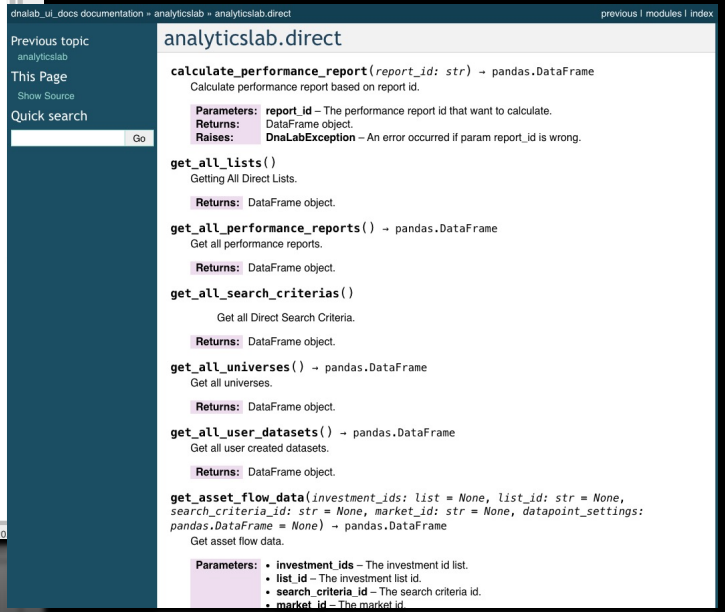
| | | |
|---|---|---|
| POST | `/apps` | Create a starflow application in the Core Analytics Platform. |
| GET | `/apps/{appName}` | Get app information |
| PATCH | `/apps/{appName}` | Update partial starflow application info |
| POST | `/apps/{appName}/environments` | Create an environment to run the starflow application. |
| PATCH | `/apps/{appName}/environments/{envName}` | Update the starflow application runtime environment |
| GET | `/apps/{appName}/environments/{envName}` | Get app environment level information |
| POST | `/gitevent` | Send a git event notification of the starflow application repository. |
| GET | `/apps/environments` | Get app name and environment name for the matching S3 bucket path |
| POST | `/apps/{appName}/environments/{envName}/execute` | Trigger the app build in the desired environment. |
| POST | `/apps/{appName}/environments/{envName}/promote` | Promote a non-prod app environment to production. |

# Analytics Lab



# Easy Access to Data and Compute



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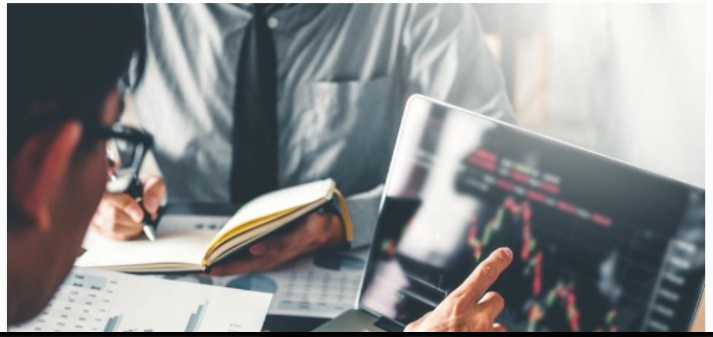
When the New York Stock Exchange (NYSE) announced plans to delist several large Chinese telecom firms in January 2021, investors grew concerned. The move was a response to an executive order targeting companies suspected of helping the Chinese military, and it required investors to divest of the affected stocks by November.



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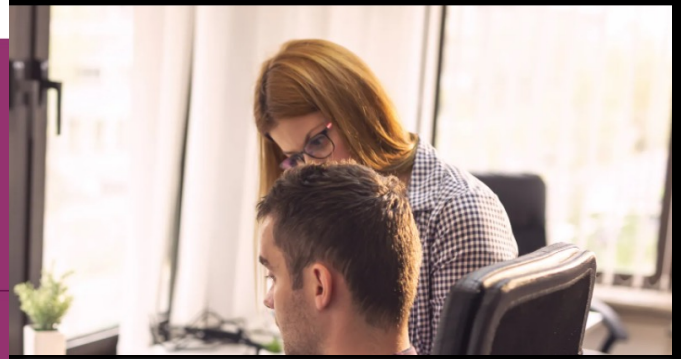

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