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MLOps Overview

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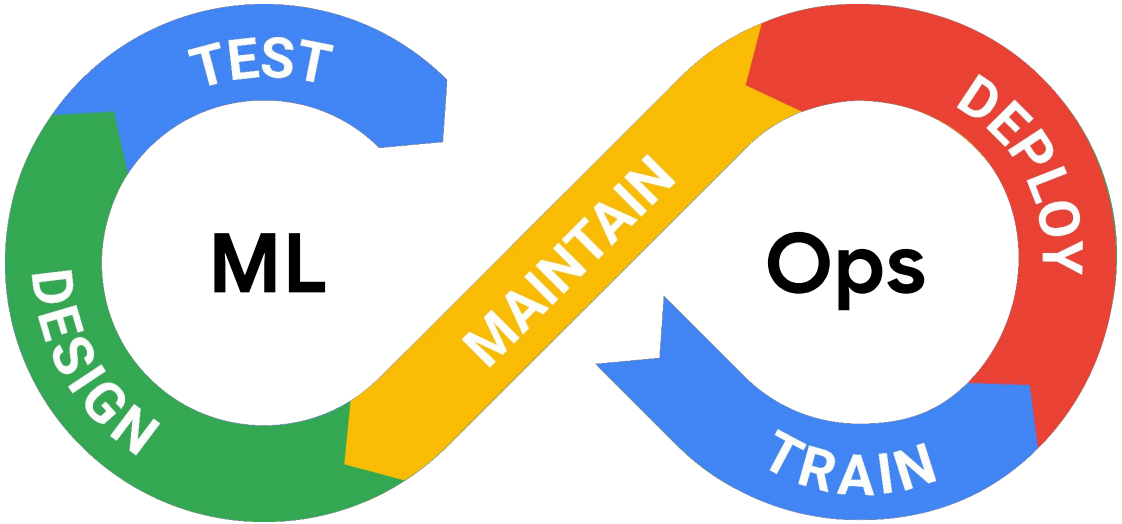

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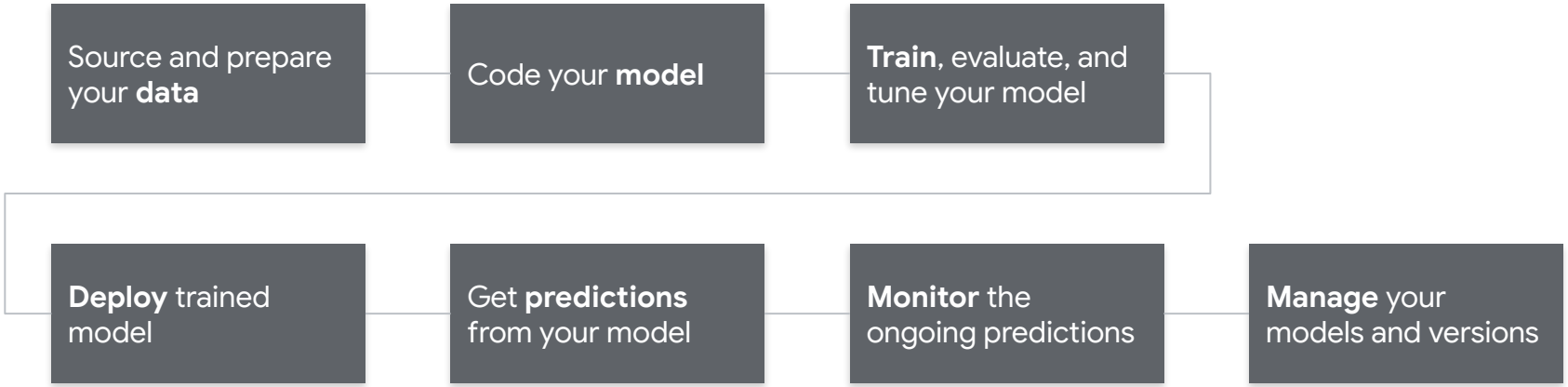
The Machine Learning Workflow



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The Machine Learning Workflow

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MLOps = ML Workflow + Automation

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MLOps means...

5 Focus Areas

- Running end-to-end
- Managing Complexity
- Evaluating Results
- Improving Models
- Tracking deployments

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labeled data

Data Engineer

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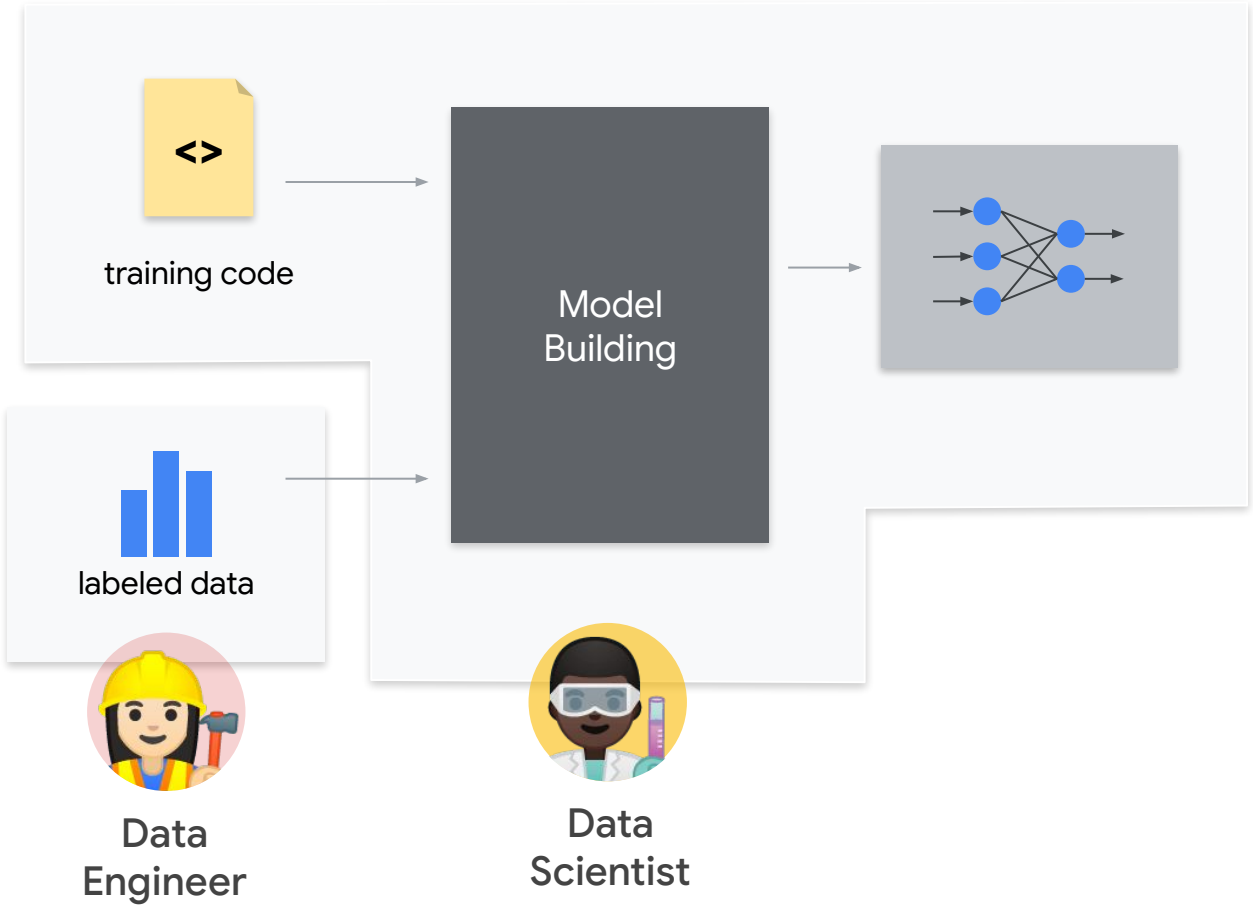

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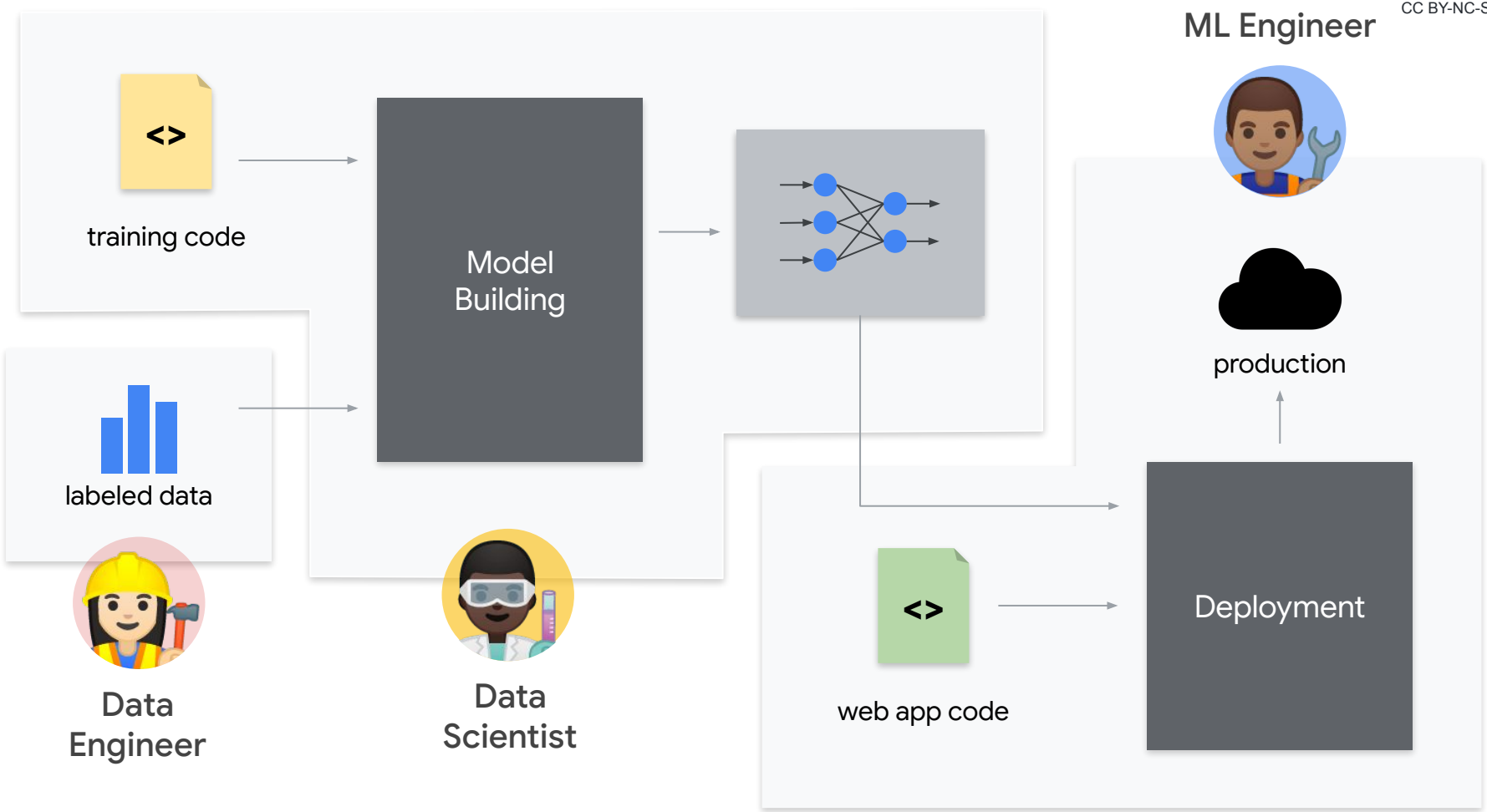

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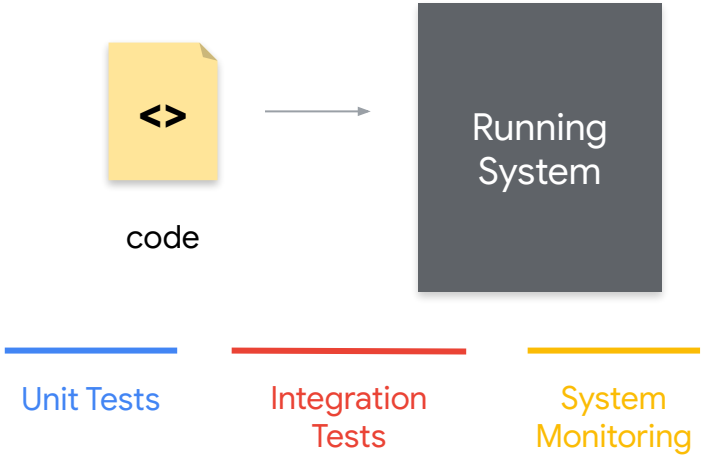
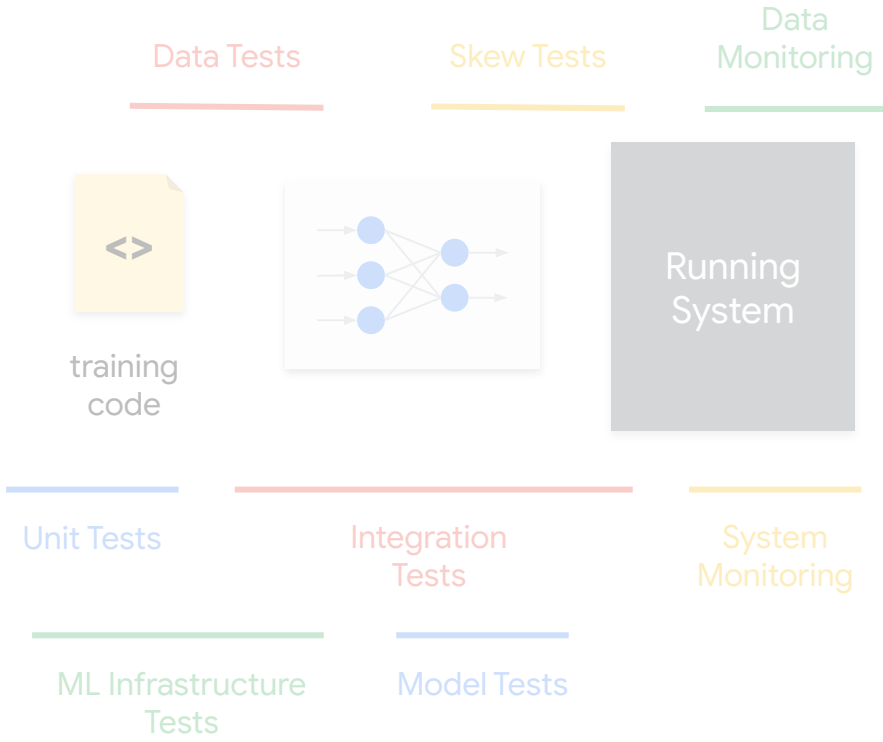


Traditional System Testing



ML-based System Testing

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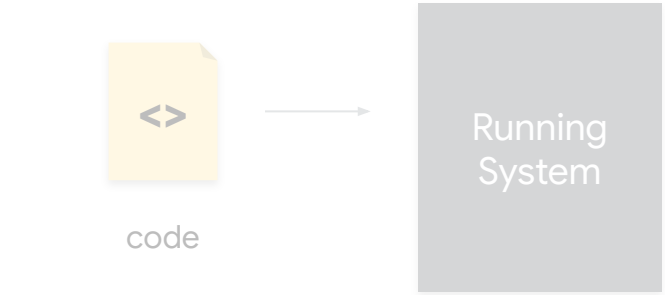


Unit Tests

Integration Tests

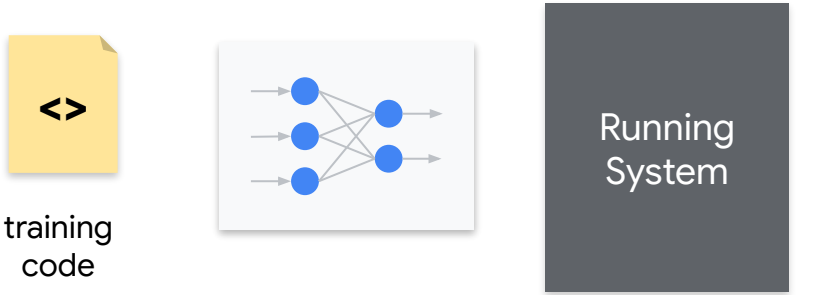
System Monitoring

Traditional System Testing

Data Tests

Skew Tests

Data Monitoring



Unit Tests

Integration Tests

System Monitoring

ML Infrastructure Tests

Model Tests

ML-based System Testing

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MLOps Tools

Custom Scripts

Frameworks

*TensorFlow **Extended** **(TFX)***

End-to-end Platforms

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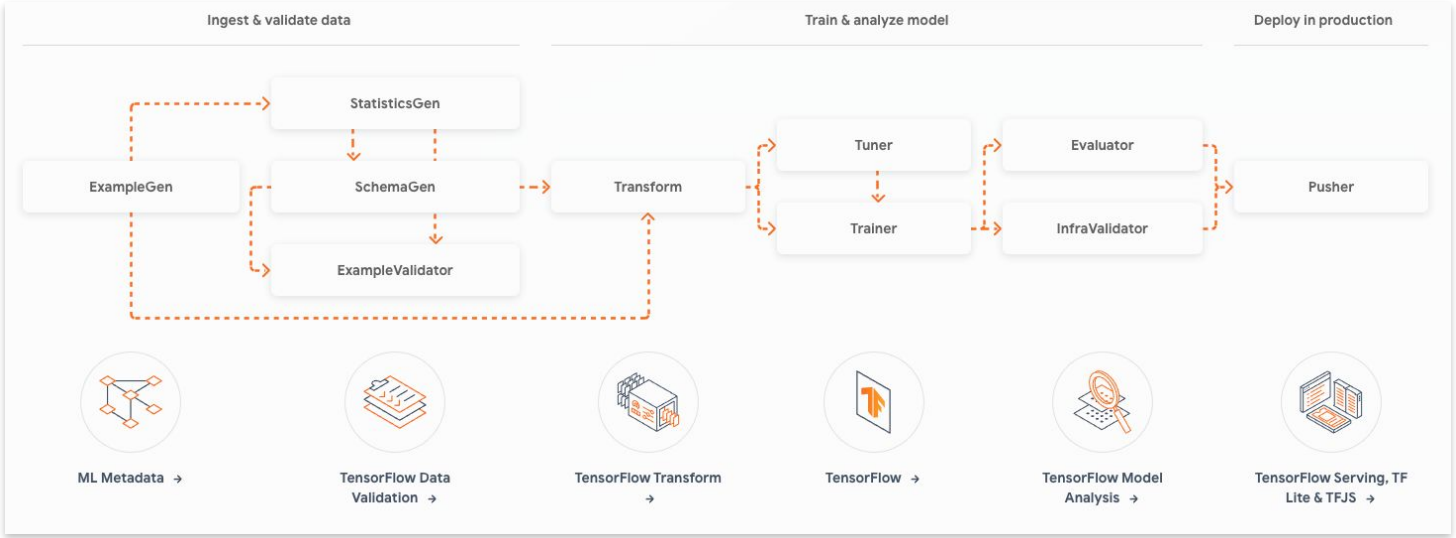
Google's TensorFlow **eXtended** (TFX)



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AWS **SageMaker**

SageMaker Ground Truth
Build / Manage training data sets

Amazon SageMaker Studio
IDE for machine learning

SageMaker Autopilot
Automatically build and train models

SageMaker Model Monitor
Auto-detect concept drift

Notebooks
One-click notebooks with elastic compute

Experiments
Capture, organize, search every step

SageMaker Neo
Train once, deploy anywhere

AWS Marketplace
Pre-built algorithms and models

Debugger
Debug and profile training runs

Amazon Augmented AI
Add human review of predictions

Auto Model Tuning
One-click hyperparameter optimization

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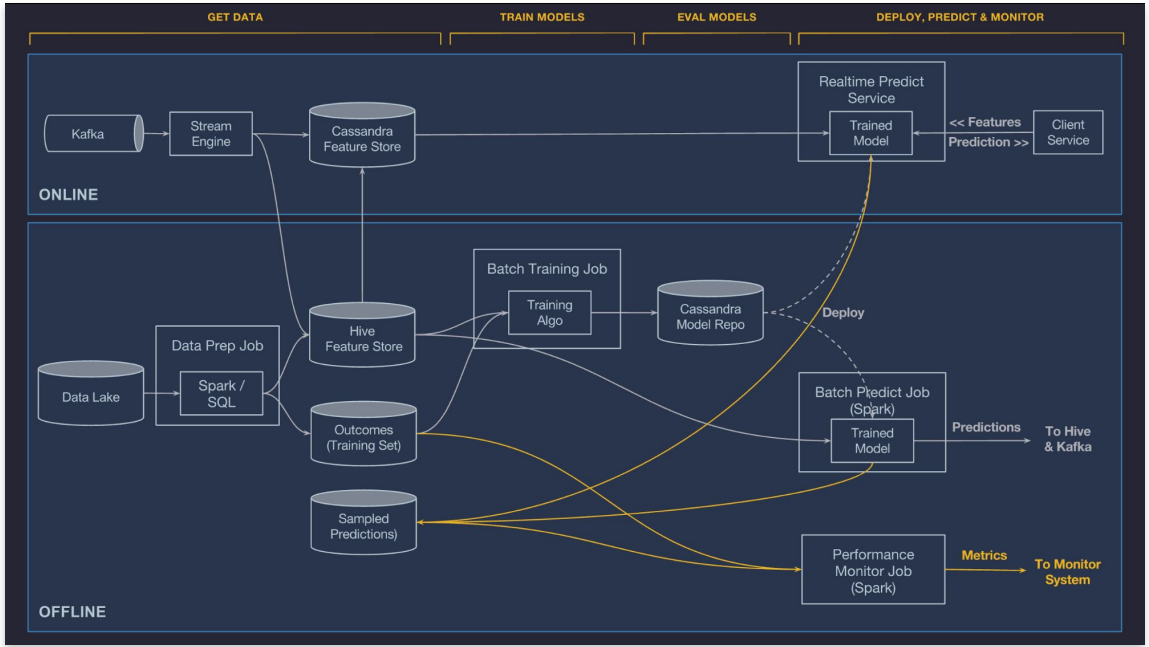
Uber **Michelangelo**



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More Company-centered **MLOps** Tools

Airbnb **Bighead**

Netflix **Metaflow**

Lyft **Flyte**

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Why these companies build **MLOps** tools?

- **No consistency** between ML Workflows

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Why these companies build **MLOps** tools?

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Why these companies build **MLOps** tools?

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Why these companies build **MLOps** tools?

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- **Wide variety of ML use-cases** across the company
- Existing ML **workflows are slow**, fragmented, and brittle
- **Build and forget** ML as a linear process

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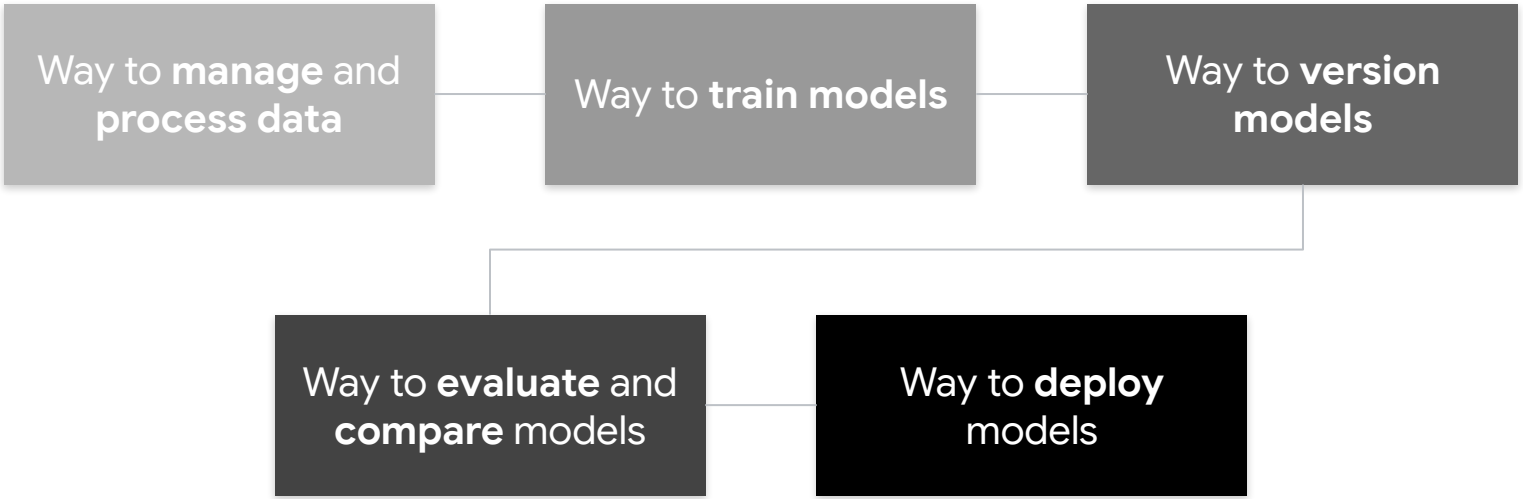
Basic features of MLOps tool



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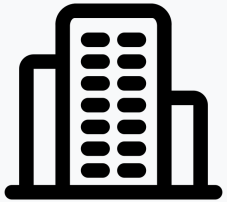
Collaboration

Academia



Industry

Dr. Lara Suzuki

Dr. Lara Suzuki from Google where she serves as **Head of Data and AI Practice** for Google **Cloud** (AI/Machine Learning, Smart Analytics and Data Management)

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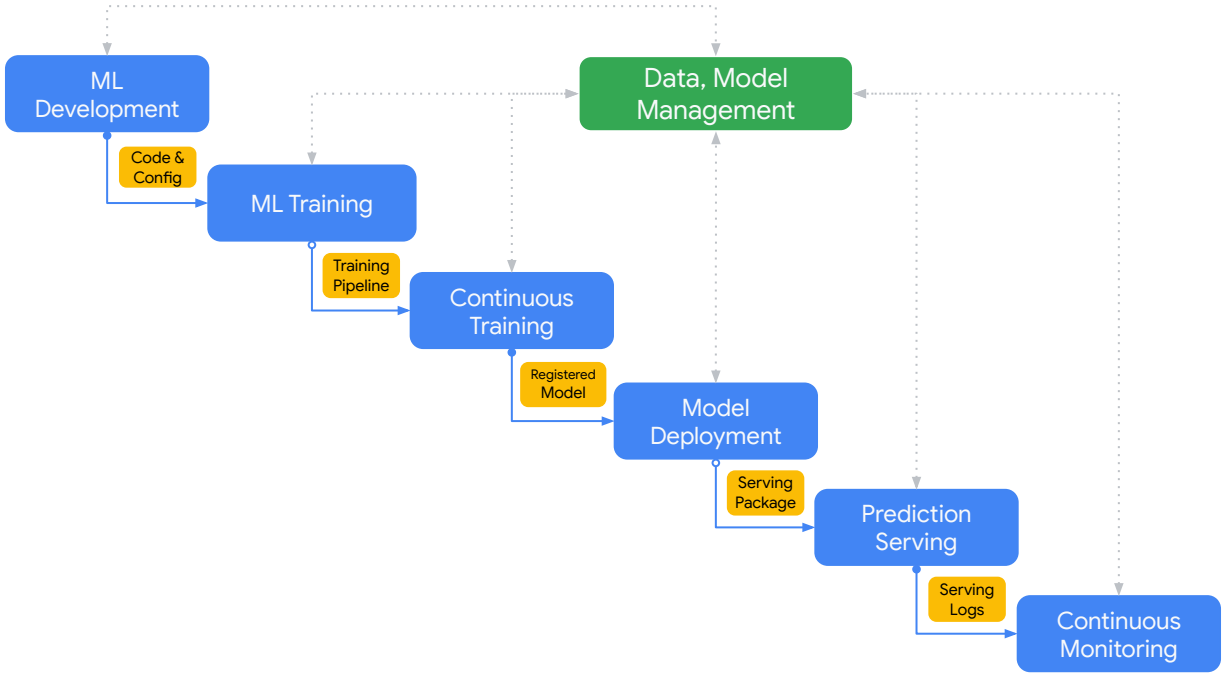
The MLOps Process



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You're **always** doing MLOps,
so make sure you do it well.