The OpenVINO toolkit overview

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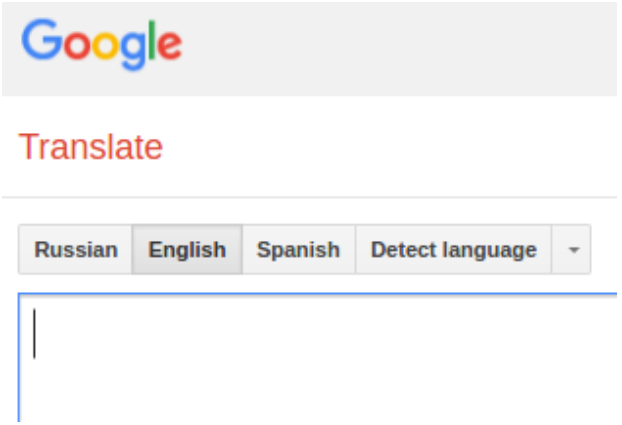
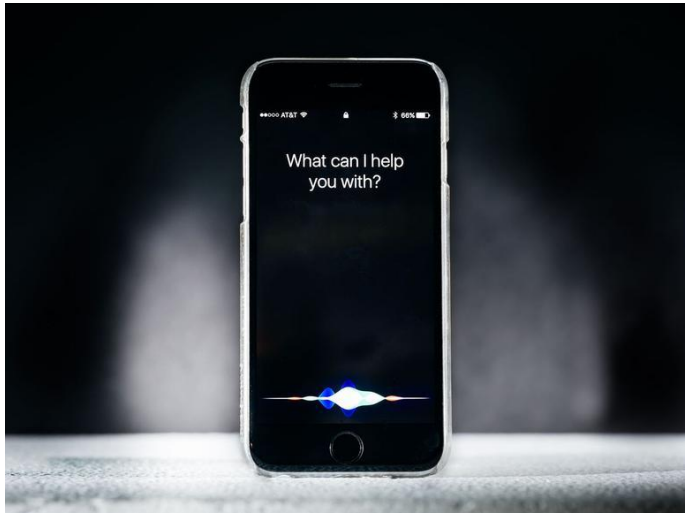
The OpenVINO Overview

- Open Visual Inference and Network Optimization
- CNN-based deep learning inference on the edge
- Heterogeneous execution across an CPU, iGPU, FPGA, VPU
- Easy-to-use library of computer vision functions and pre-optimized kernels
- Optimized calls for computer vision standards, including OpenCV*, OpenCL™, and OpenVX*

Deep learning in modern life

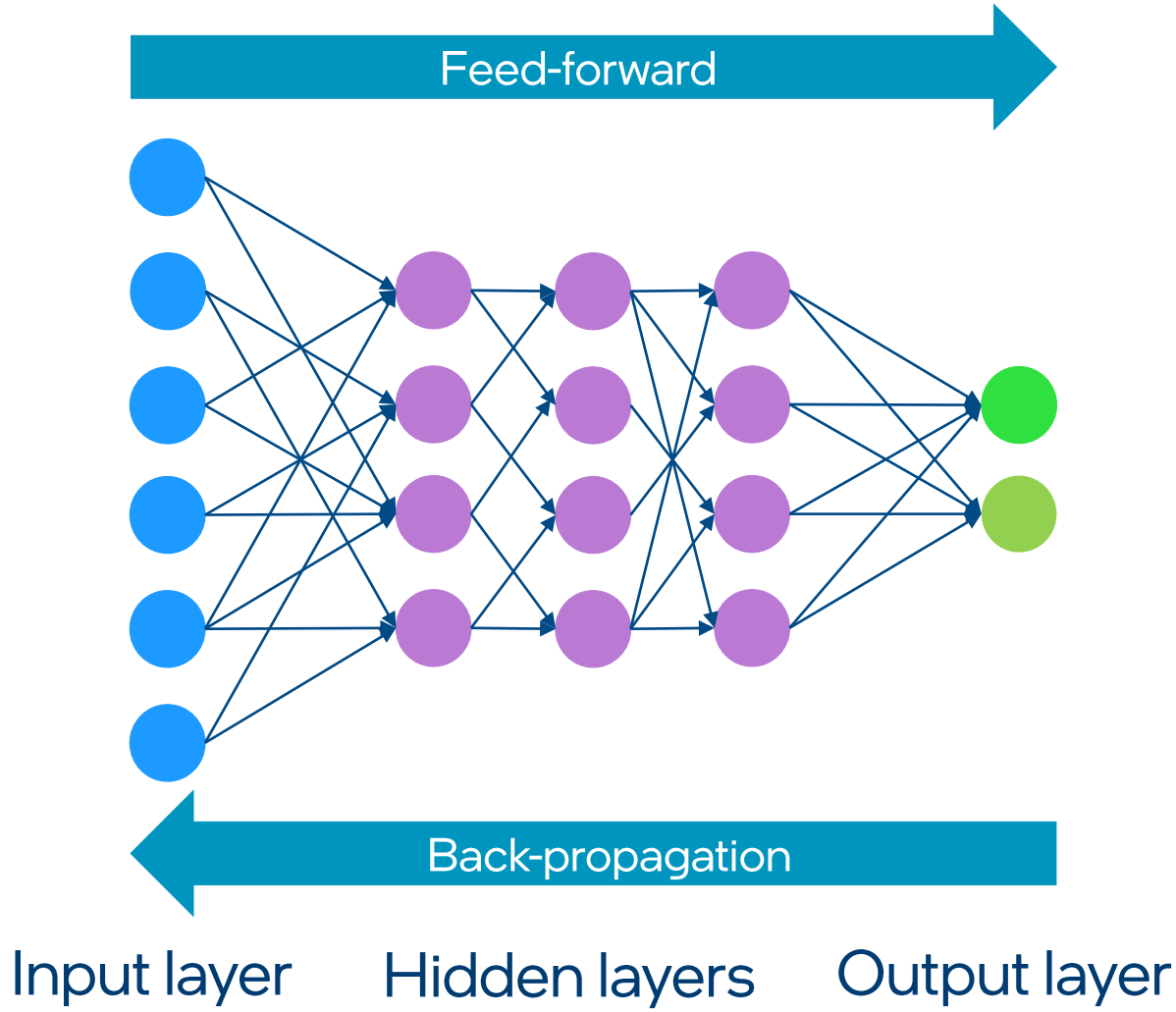




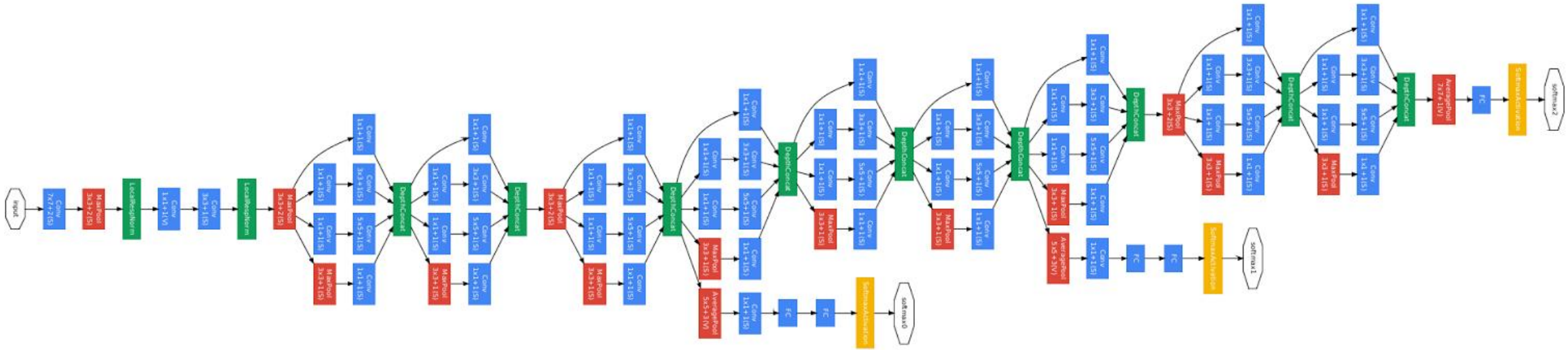
PRISMA

Image credit: DeepMind, Prisma, Yayvo, Google Translate, Redmond Pie, TechRepublic, Brit

Deep neural network



Real deep neural network



Training vs Inference

Training

- Huge amount of data
- Long-term process
- Feed-forward and backpropagation algorithm
- Network weights obtaining in process

Inference

- Single image or image stream in real-time
- Real-time* process
- Only feed-forward
- Network weights fixed

Training vs Inference

Training

Inference

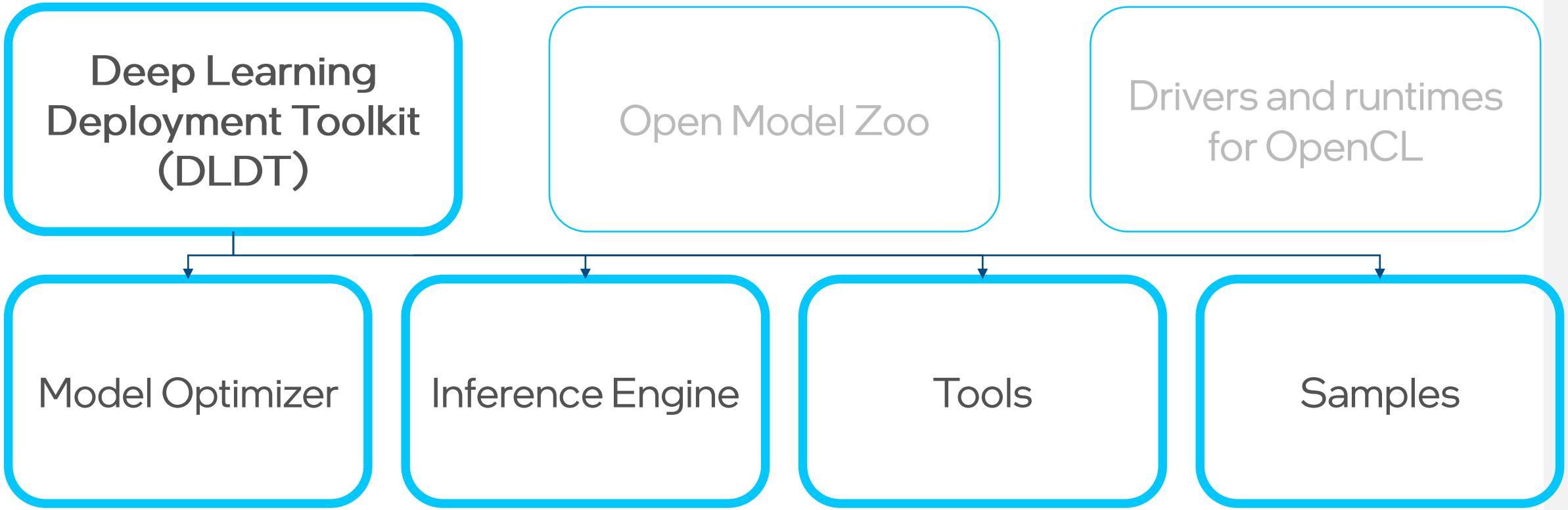
The OpenVINO toolkit overview

Deep Learning Deployment Toolkit (DLDT)

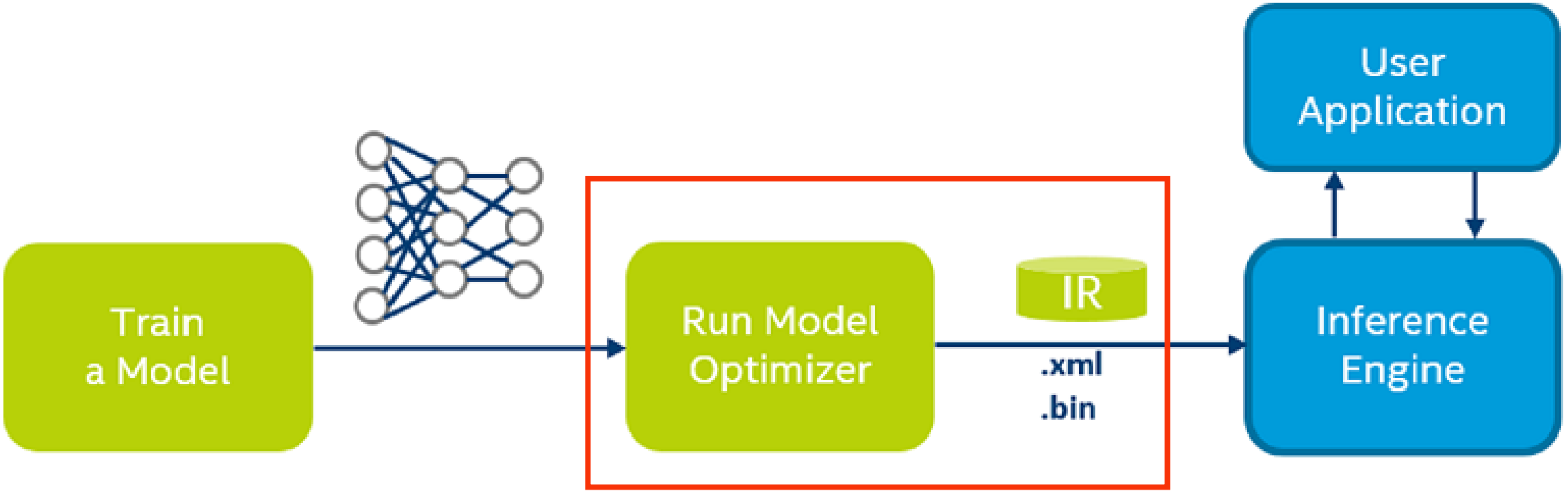
Open Model Zoo

Drivers and runtimes for OpenCL

The OpenVINO toolkit overview

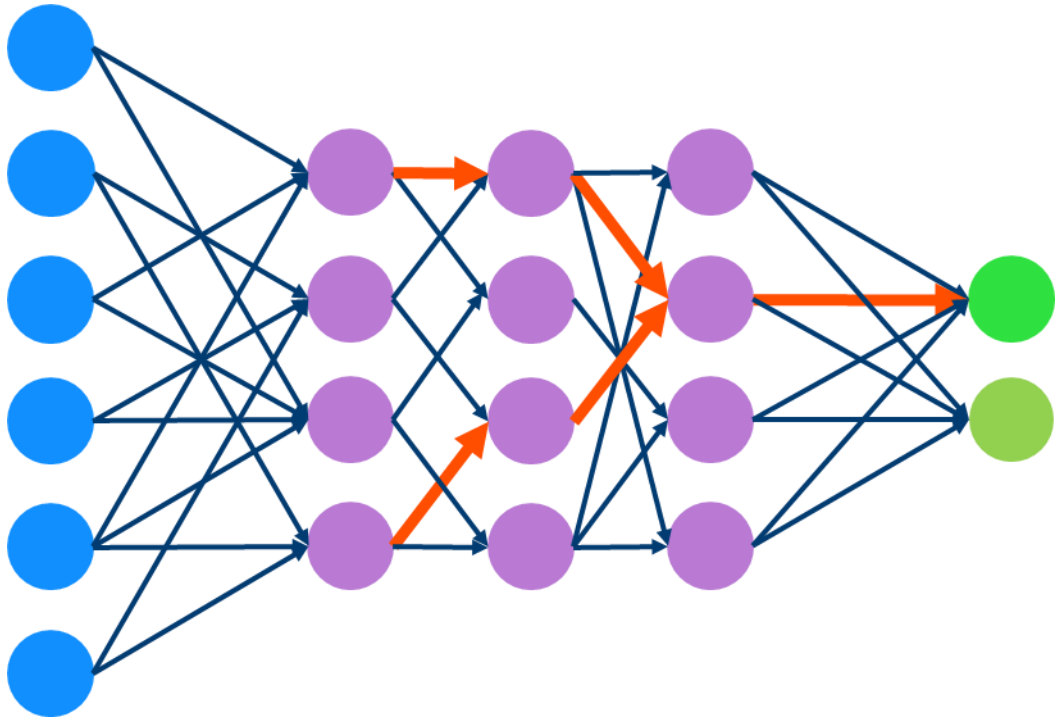


The Model Optimizer

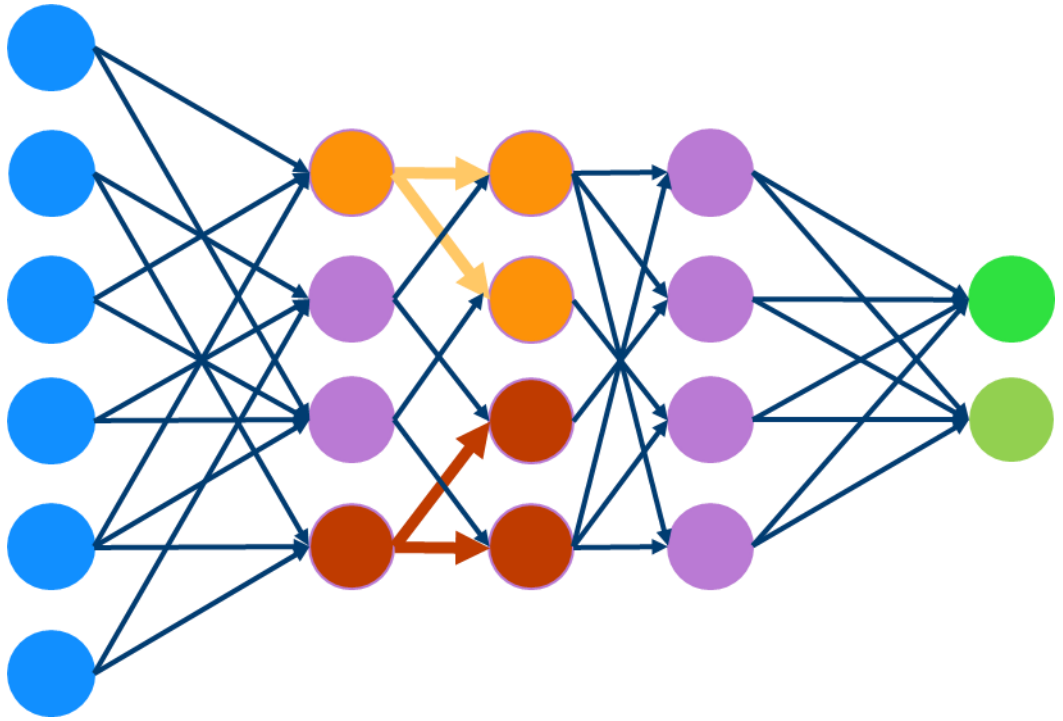


The Model Optimizer: the “-O2” for model

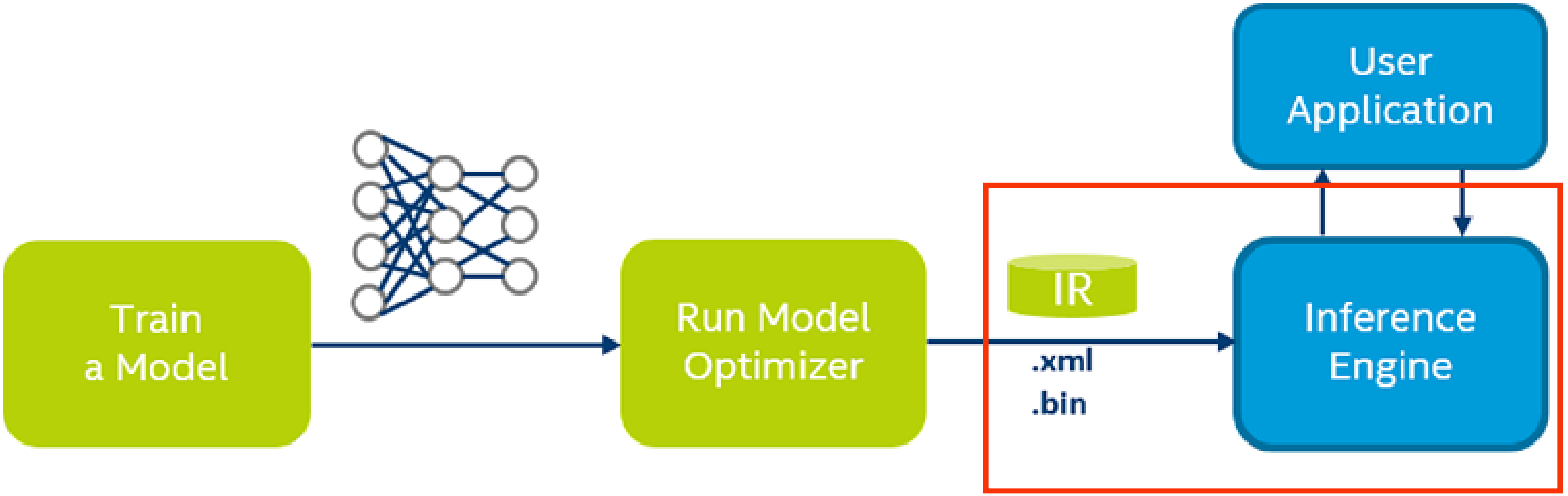
Search equivalent operations



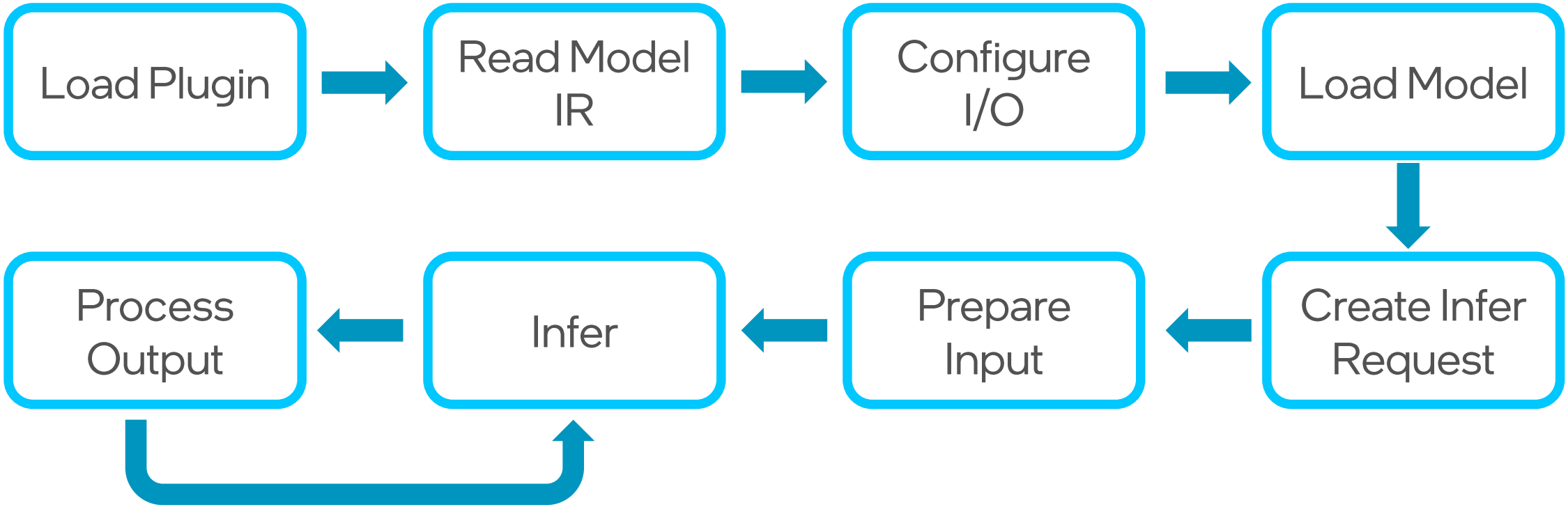
Graph transform operations



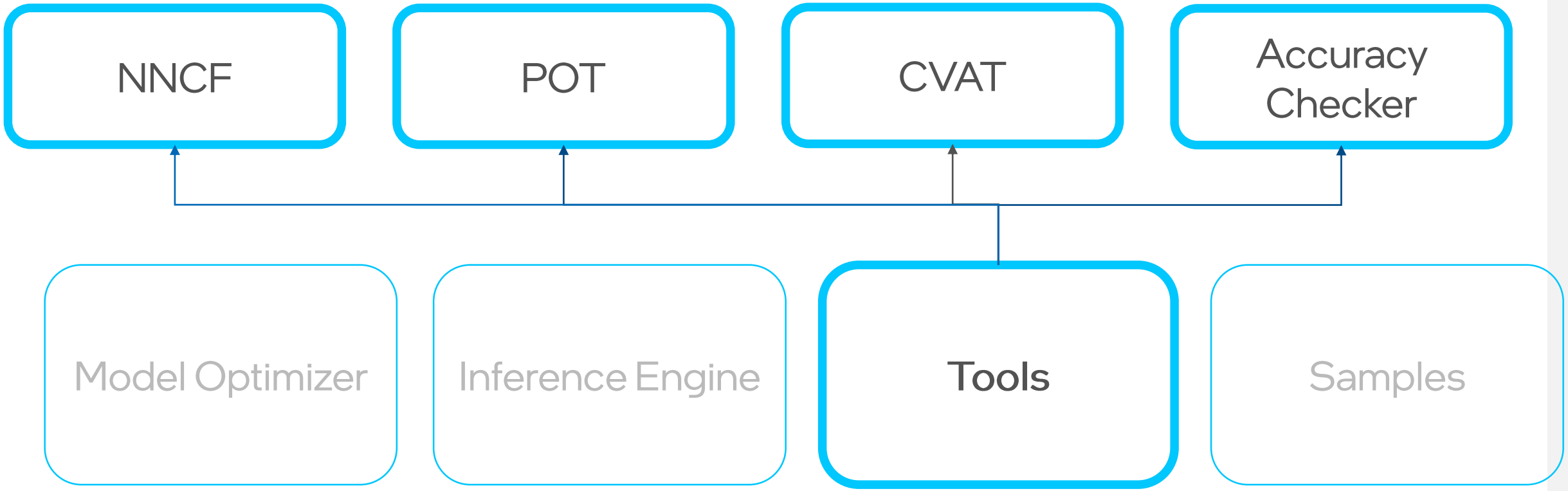
The Inference Engine



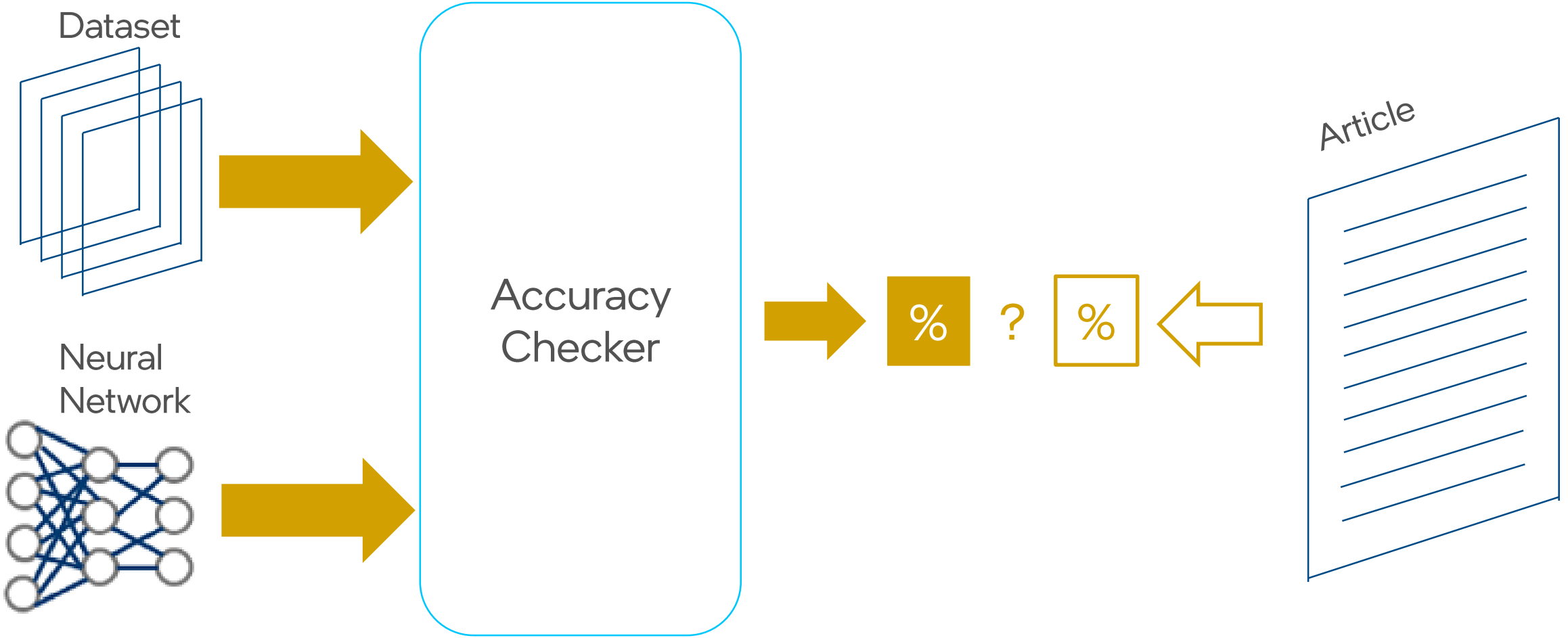
The Inference Engine: workflow



The OpenVINO toolkit: Tools



Accuracy Checker: Deep Learning accuracy validation framework



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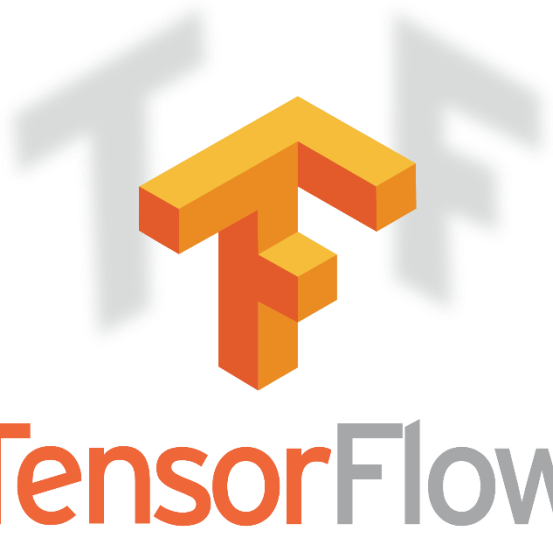
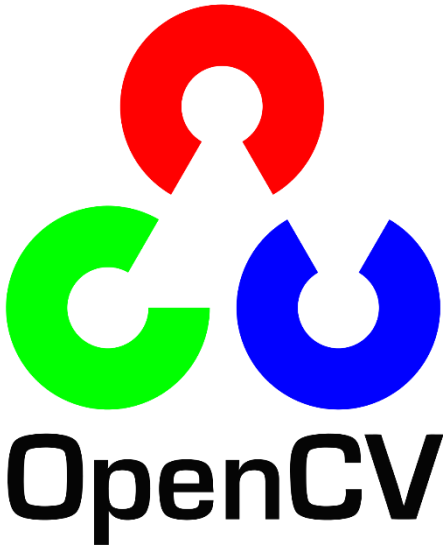
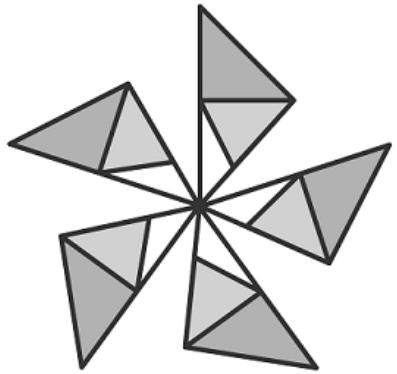
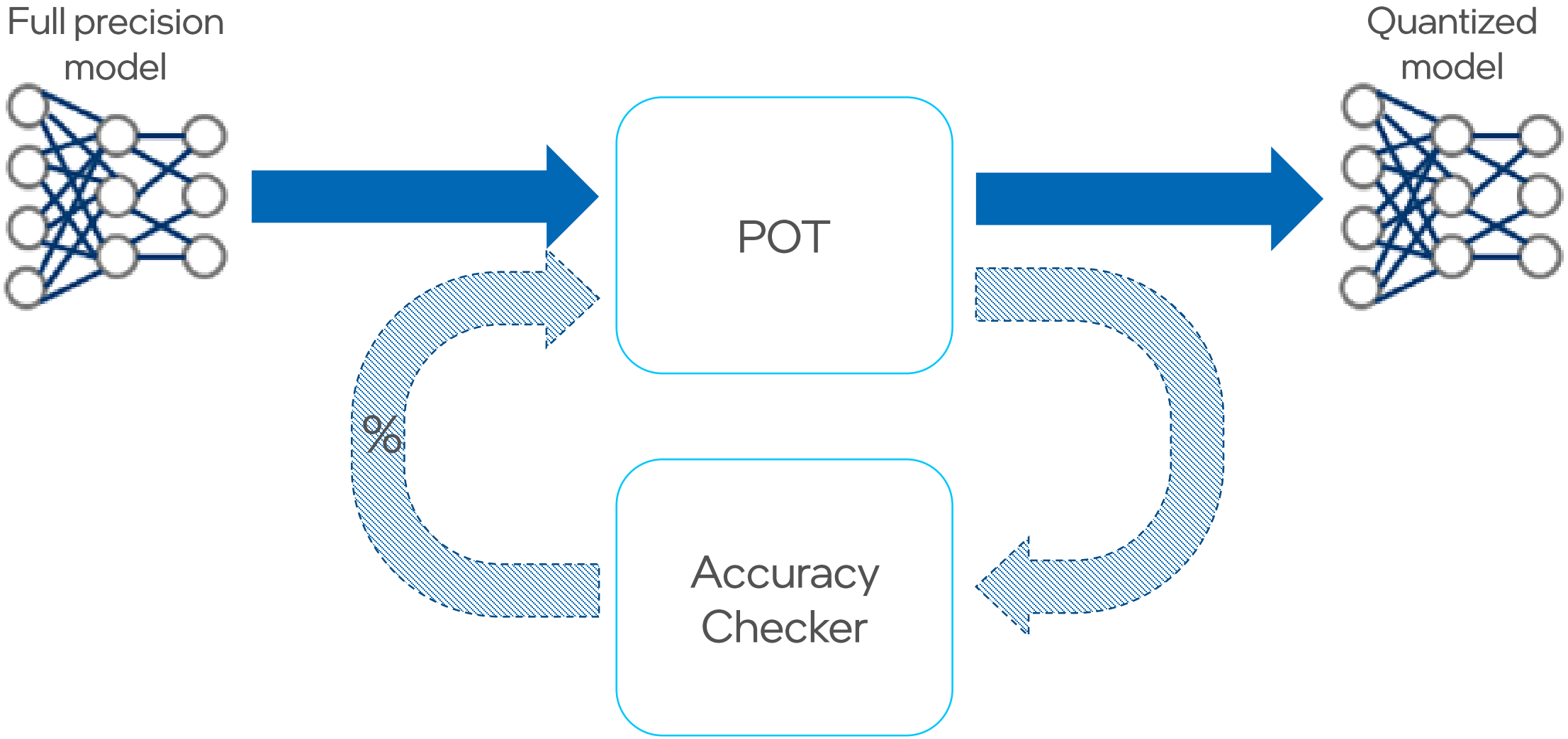






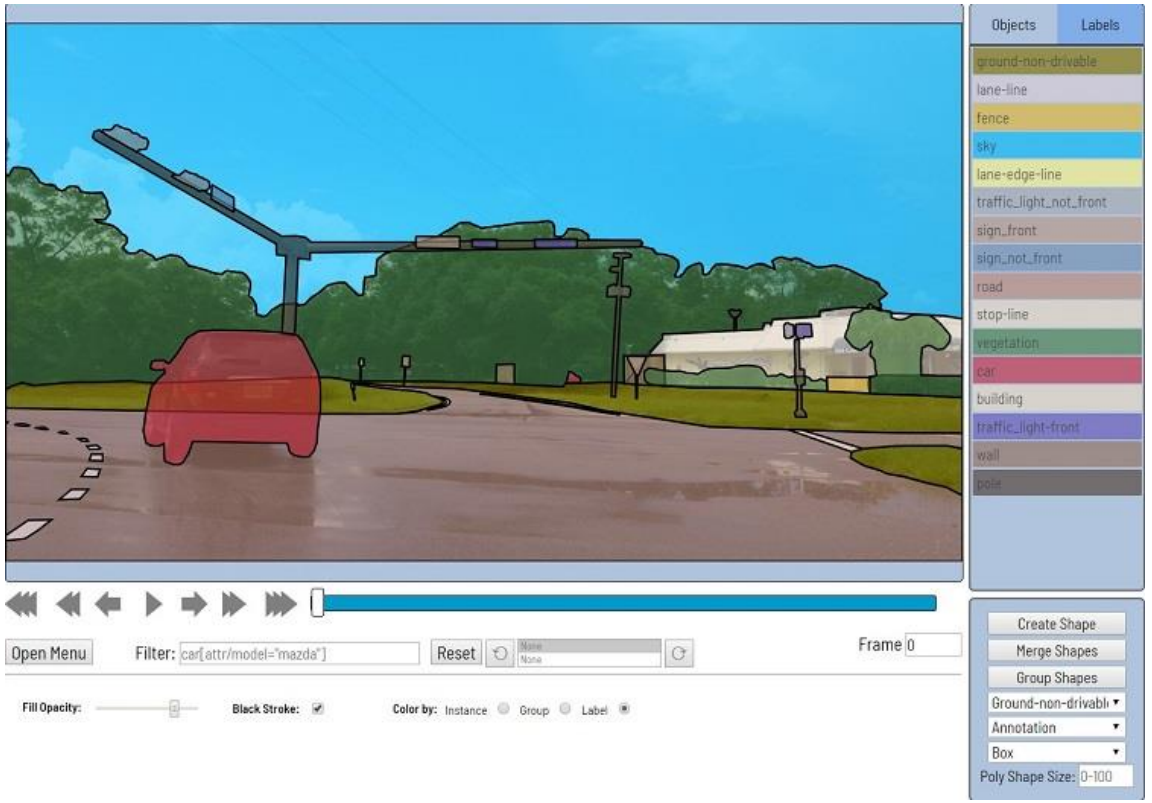
ONNX RUNTIME

Post-training Optimization (POT)



Computer Vision Annotation Tool (CVAT)

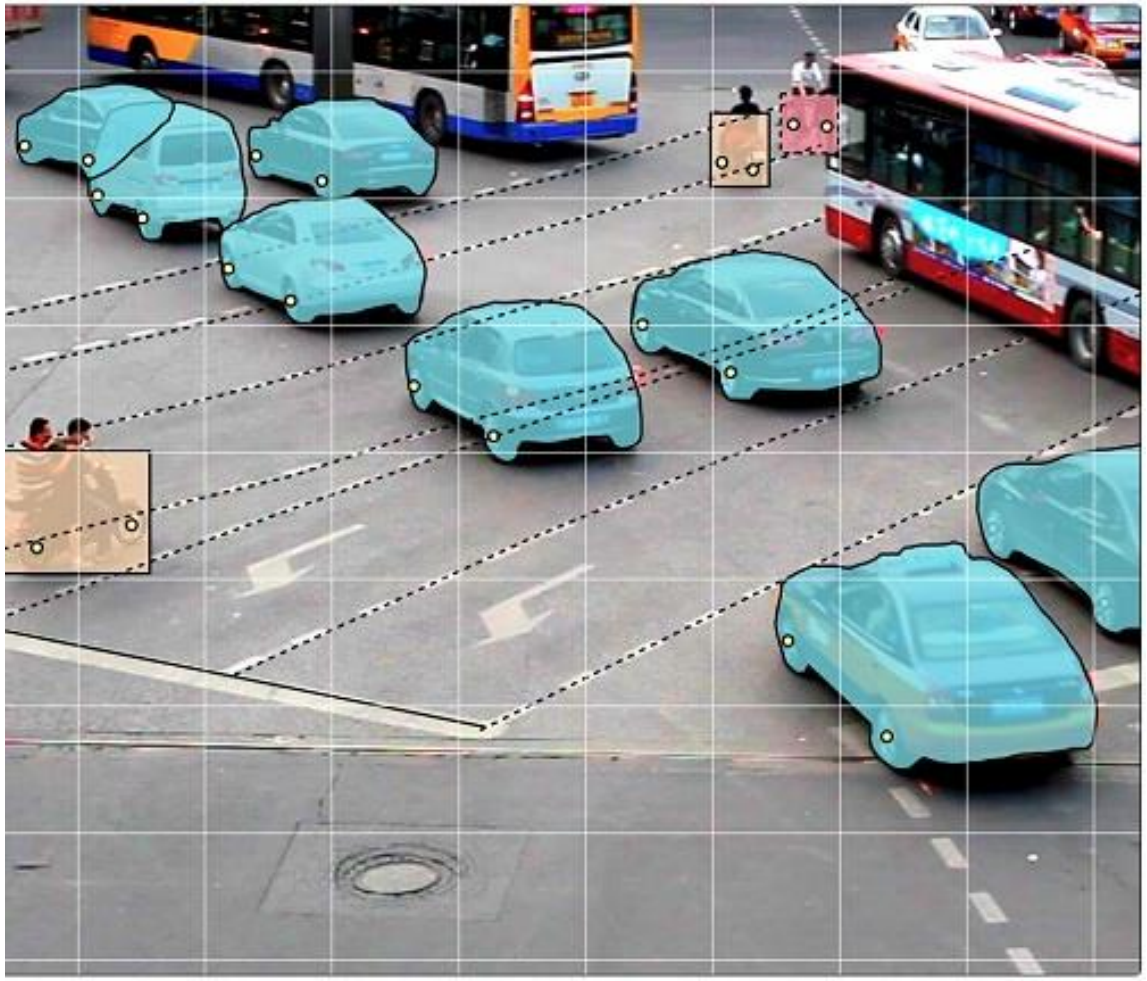
- Data annotation for CV
  - Image
  - Video
- Computer vision tasks
  - Object detection
  - Image classification
  - Image segmentation
- Automatic annotation
  - Interpolation between keyframes
  - Semiautomatic segmentation



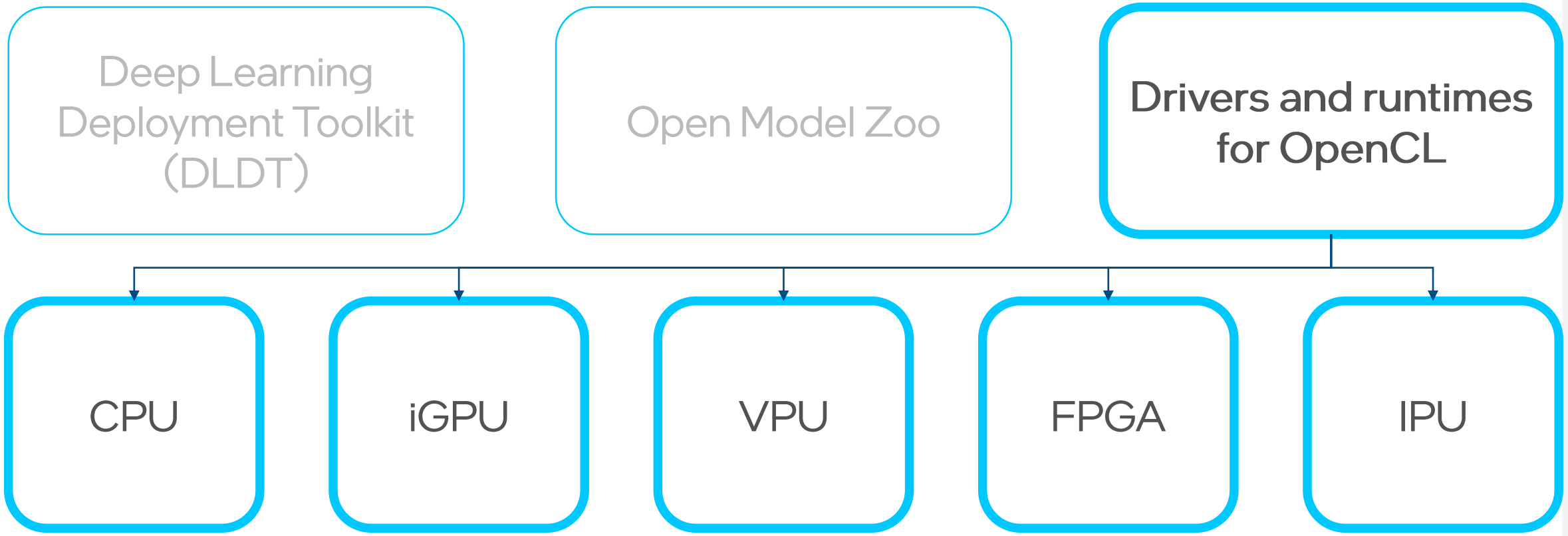
https://github.com/openvinotoolkit/cvat

Computer Vision Annotation Tool (CVAT)

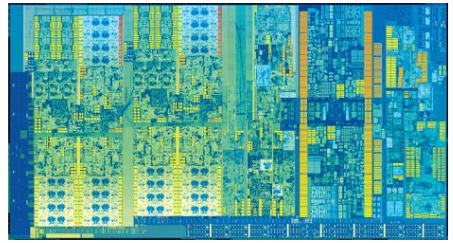
- Primitives
  - Boxes
  - Polygons
  - Polylines
  - Points

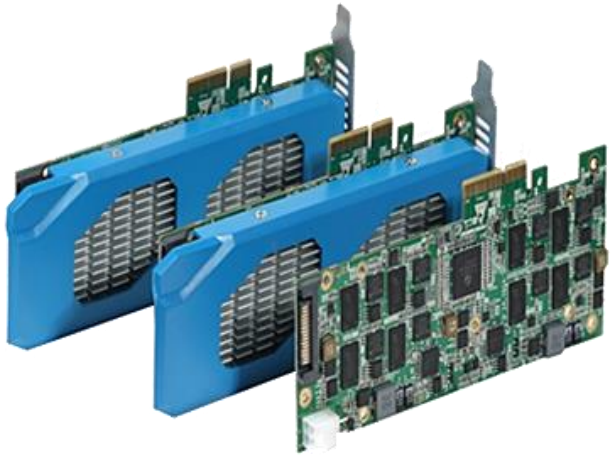


The OpenVINO toolkit overview

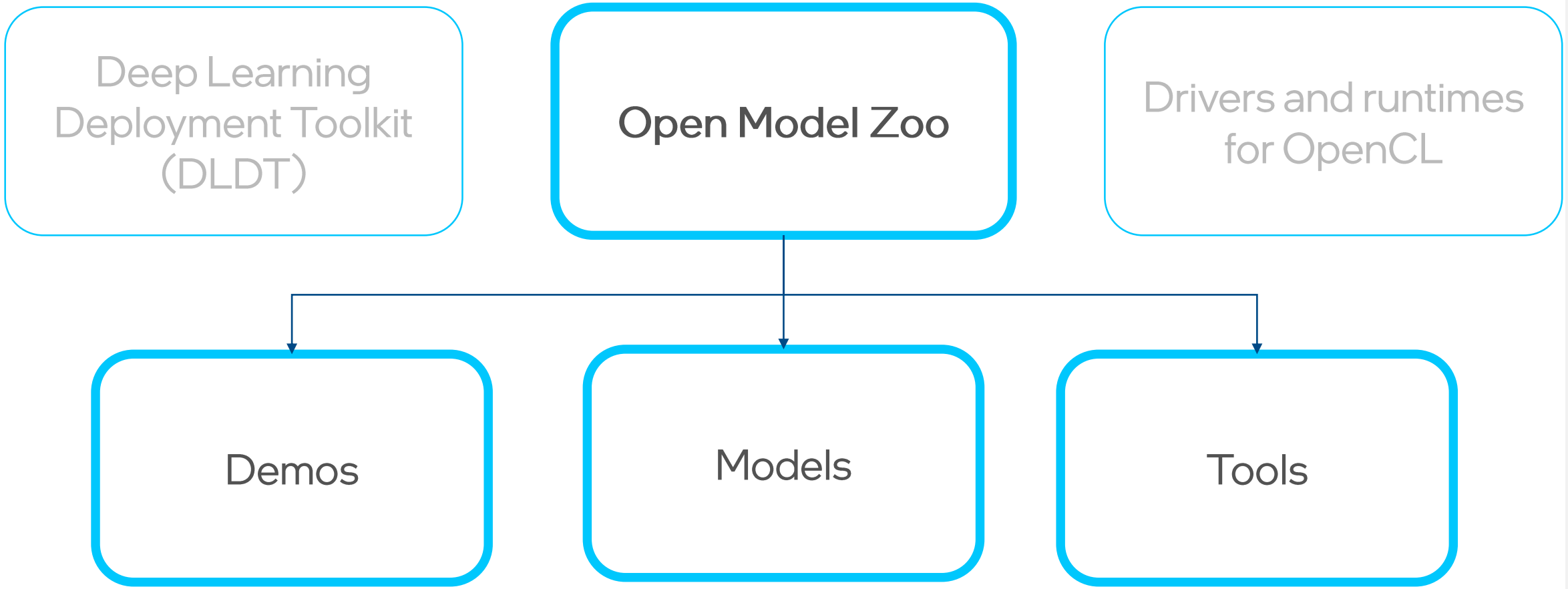


Computer Vision Hardware





The OpenVINO toolkit: Open Model Zoo



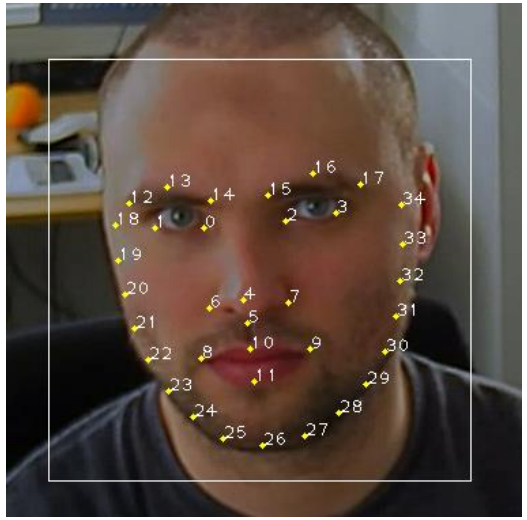
https://github.com/openvino/open_model_zoo

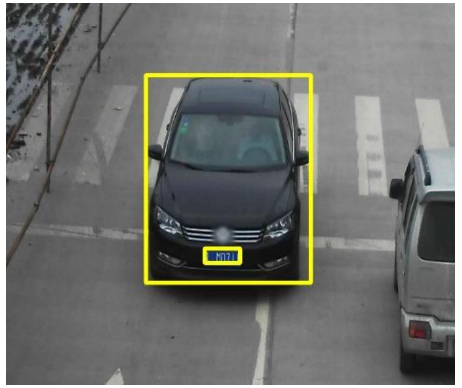
Open Model Zoo

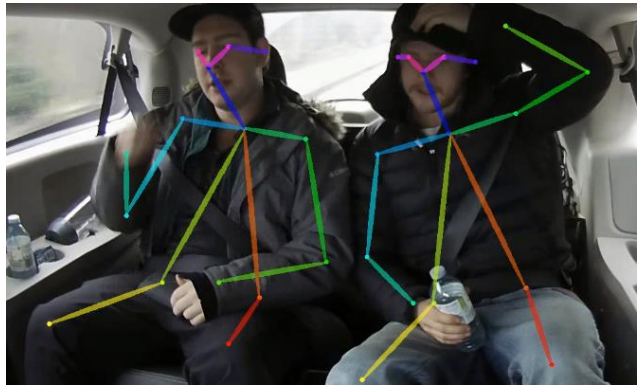
- Over 200 models, optimized and ready for inference
  - Models, developed, pretrained and finetuned by Intel`s data scientists
  - Most popular public models, supported by OpenVINO and validated by Intel`s engineers
  - Optimized models (quantized, binary and sparsed models)
- Over 20 demo applications
  - C\C++ and Python
  - Simple case
  - Complex models pipelines
- Tools for downloading and auto-converting models
- Accuracy Checkers for validation

Open Model Zoo

- Computer vision
  - Image classification
  - Object detection (common objects, faces, license plates, etc.)
  - Instance segmentation
  - Semantic segmentation
  - Keypoints detections (face landmarks, pose keypoints, etc.)

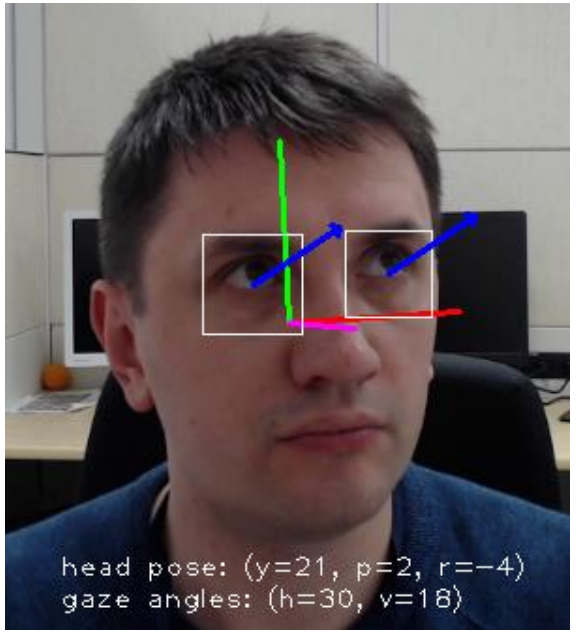






Open Model Zoo

- Attributes detection
  - Head and gaze direction
  - Open/close eyes
  - Mask detection
  - Emotions recognition
  - Gender recognition
  - Age recognition

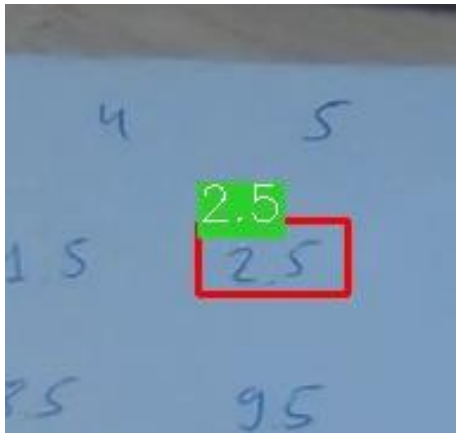


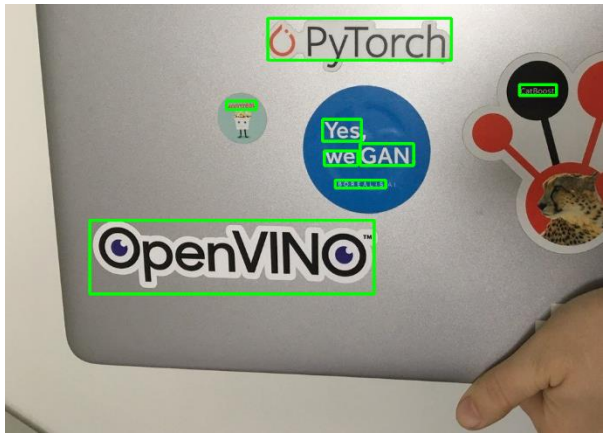
Open Model Zoo

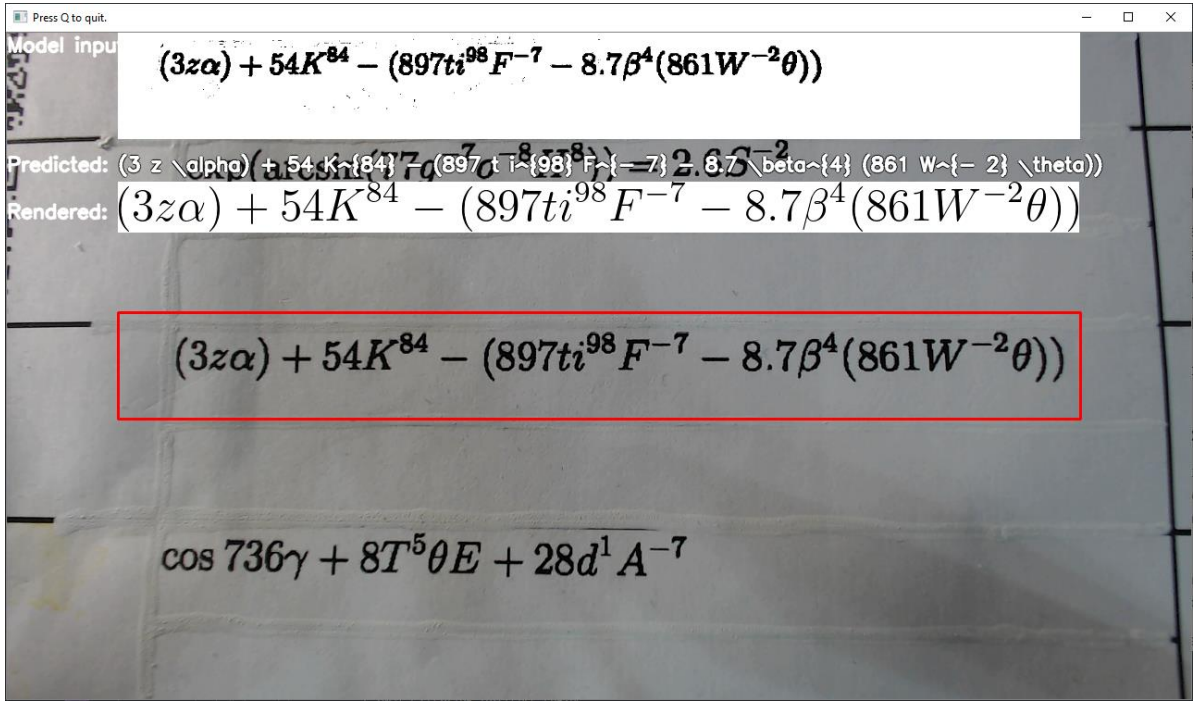
- Image generation
  - Super-resolution
  - Colorization
  - Inpainting

Open Model Zoo: models

- Text manipulations
  - Text detection and recognition
  - Formula recognition
  - Machine translation
  - Question answering

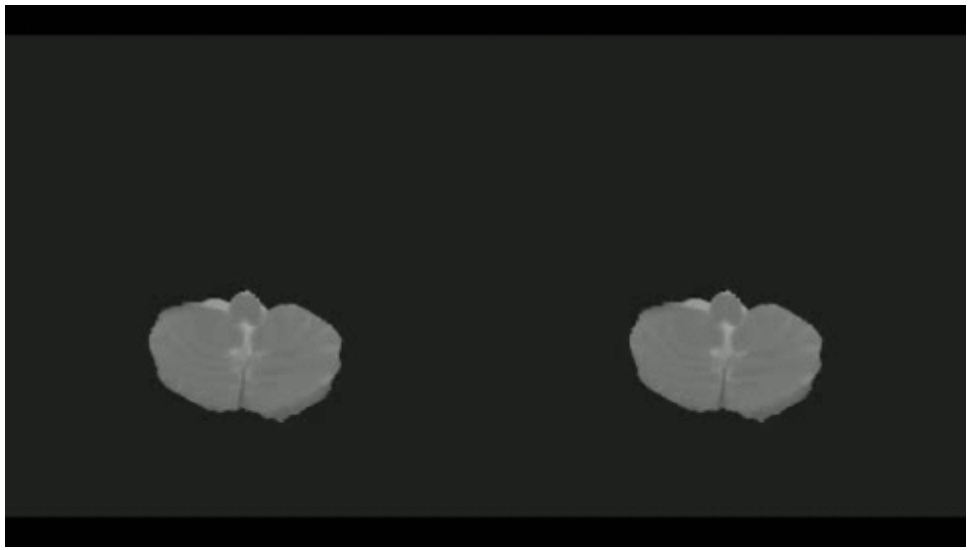






Open Model Zoo

- Brain tumor 3D segmentation
- Mono depth estimation
- Audio recognition
- Audio generation
- Action recognition
  - Common actions (sitting, eating, running, etc)
  - Sign language recognition
  - etc.

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