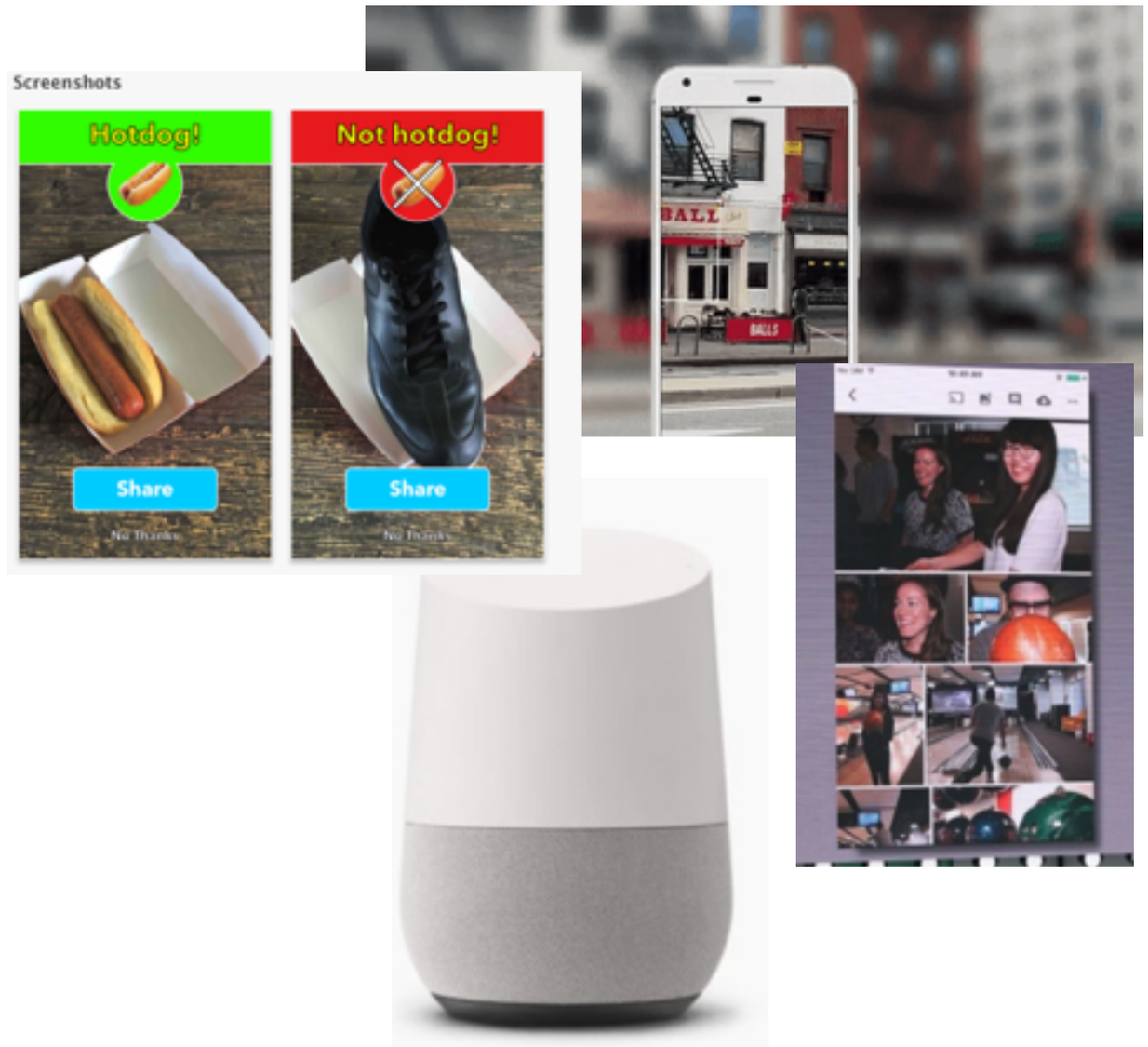
Highlights of Machine Learning Sessions

Google I/O 2017

李茵

TensorFlow+

- Google Lens
- Google Home
- Androids Things
- …



sessions -l | grep ml

- Building rich cross-platform conversational UX with API.AI
- Effective TensorFlow for Non-experts
- Open Source TensorFlow Models
- Project Magenta: Music and art with machine learning
- Using Google Cloud, TensorFlow, and the Google Assistant on Android Things
- Android meets TensorFlow
- TensorFlow Frontiers
- From Research to Production TensorFlow serving
- Pushing the boundaries of Machine Learning

High - level

Getting Started with Machine Perception using the Mobile Vision API

- Text \ Bar code \ Face
- Cloud + On-device
- API.AI

Yulong Liu
Google

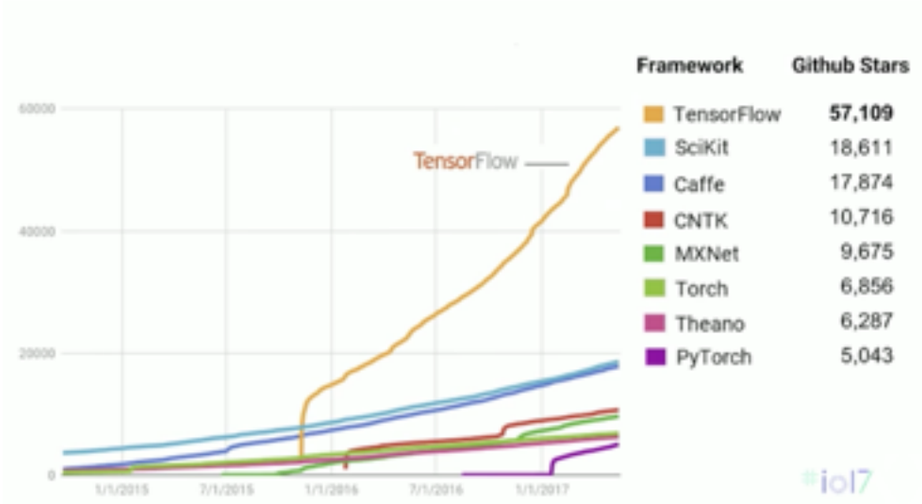
Hsiu Wang
Google

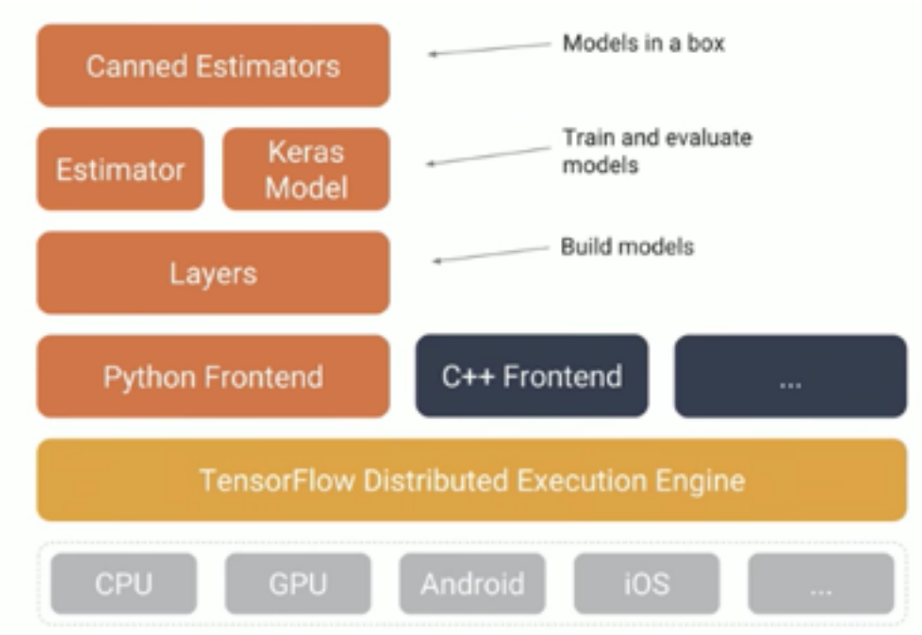
- Building rich cross-platform conversational UX with API.AI
    - chatbot
- Effective TensorFlow for Non-experts:
    - Keras Estimator
- Open Source TensorFlow Models
    - vision + NLP + artworks
    - Project Magenta: Music and art with machine learning
- Using Google Cloud, Tensorflow, and the Google Assistant on Android Things
    - IOT \ Cloud
- Android meets Tensorflow
    - acceleration

Low - level

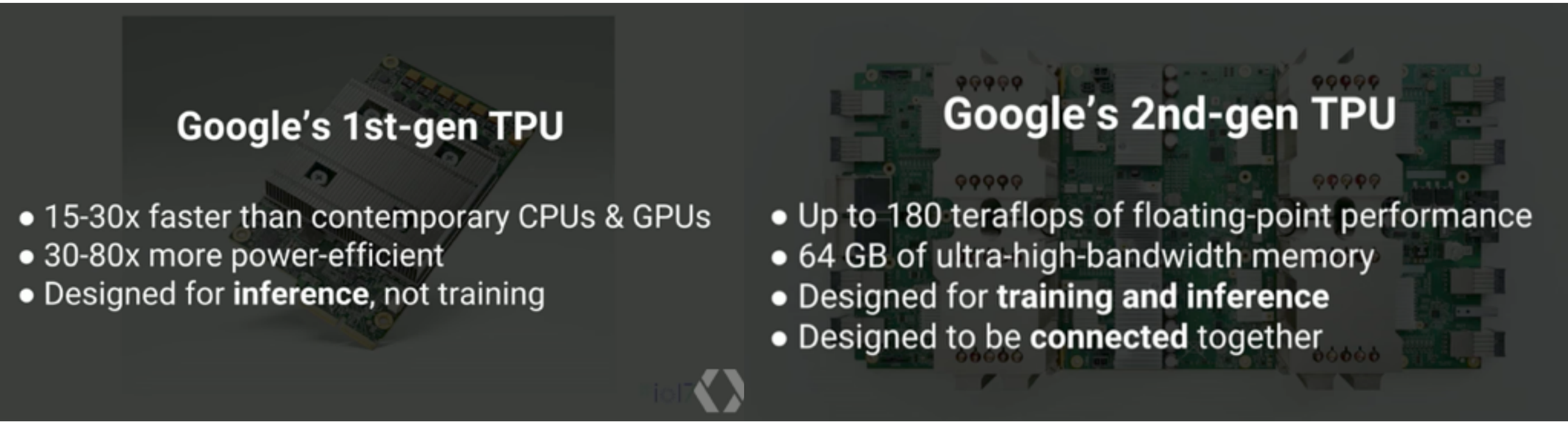
TensorFlow Frontiers

- Latest developments in 1.2
- TPU and pods
- Research cloud
  - XLA + Estimators + Datasets
  - Learn to learn

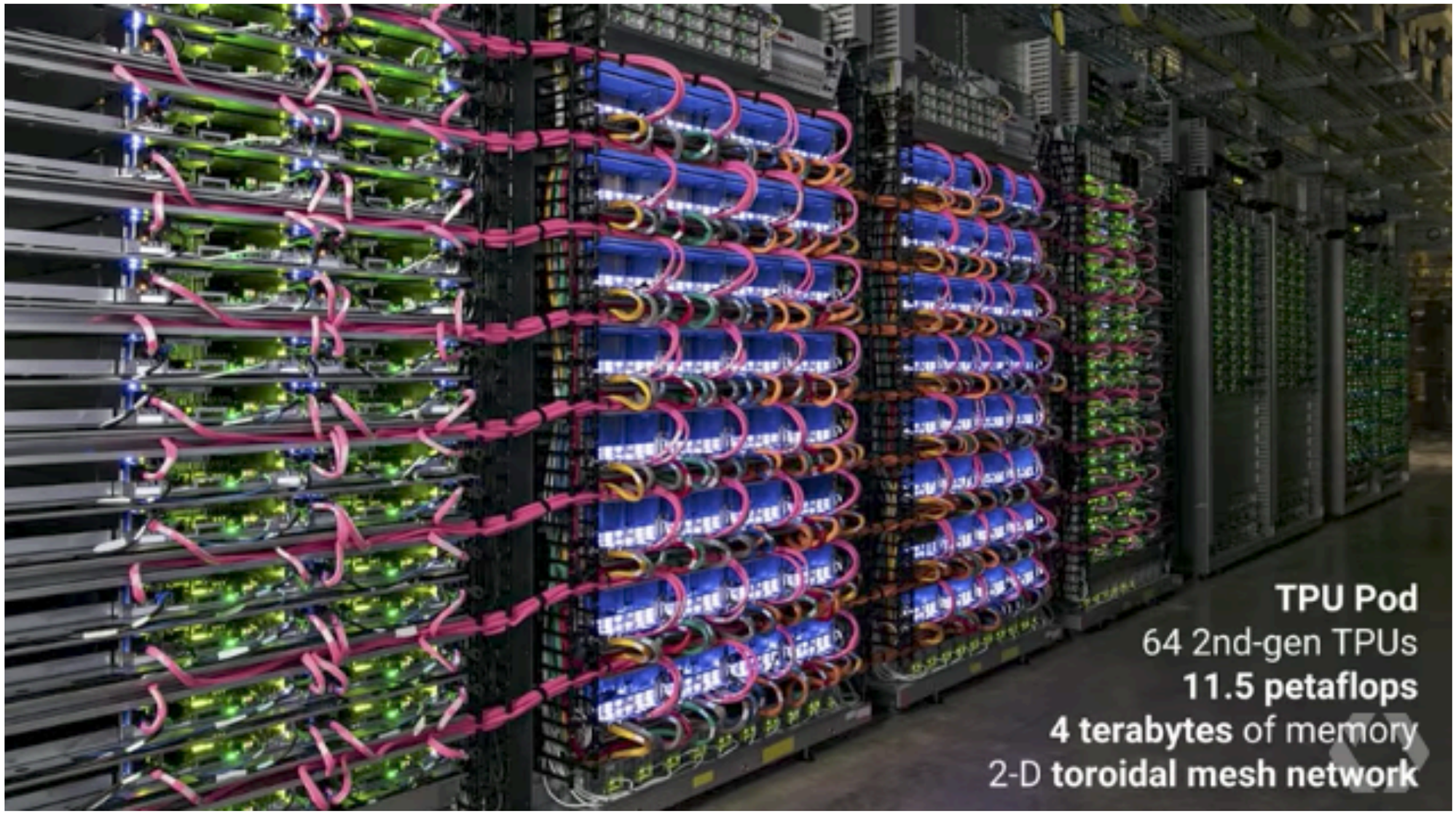




TPU

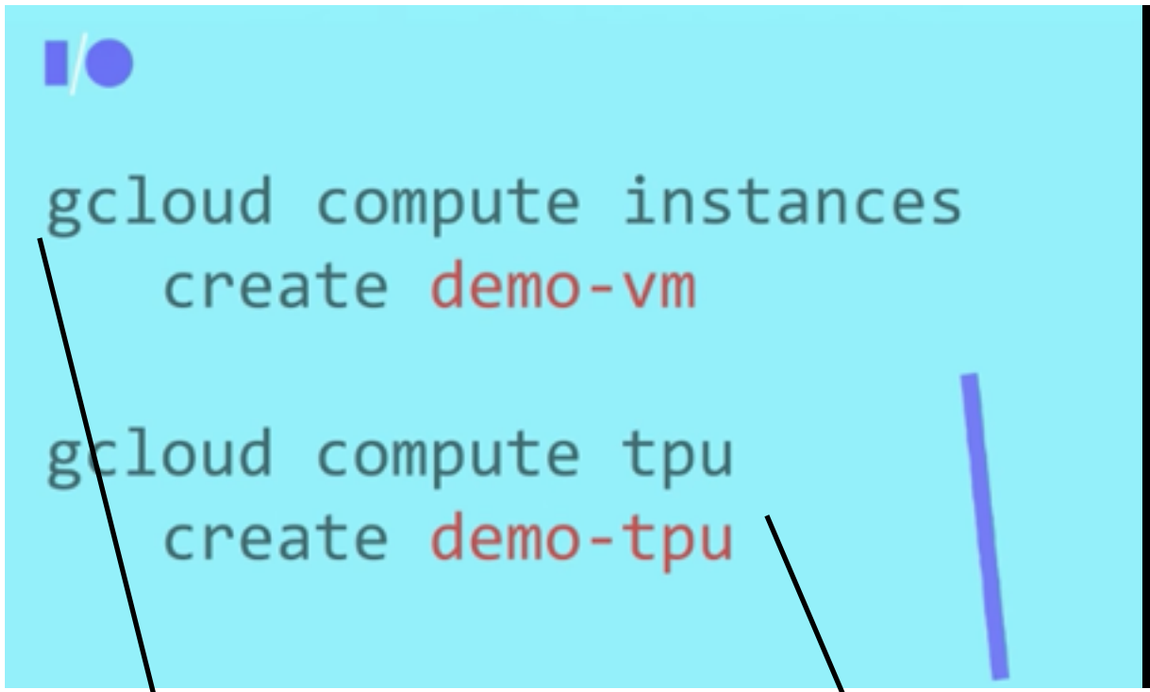

Google’s 1st-gen TPU
• 15-30x faster than contemporary CPUs & GPUs
• 30-80x more power-efficient
• Designed for **inference**, not training
Google’s 2nd-gen TPU
• Up to 180 teraflops of floating-point performance
• 64 GB of ultra-high-bandwidth memory
• Designed for **training and inference**
• Designed to be **connected** together

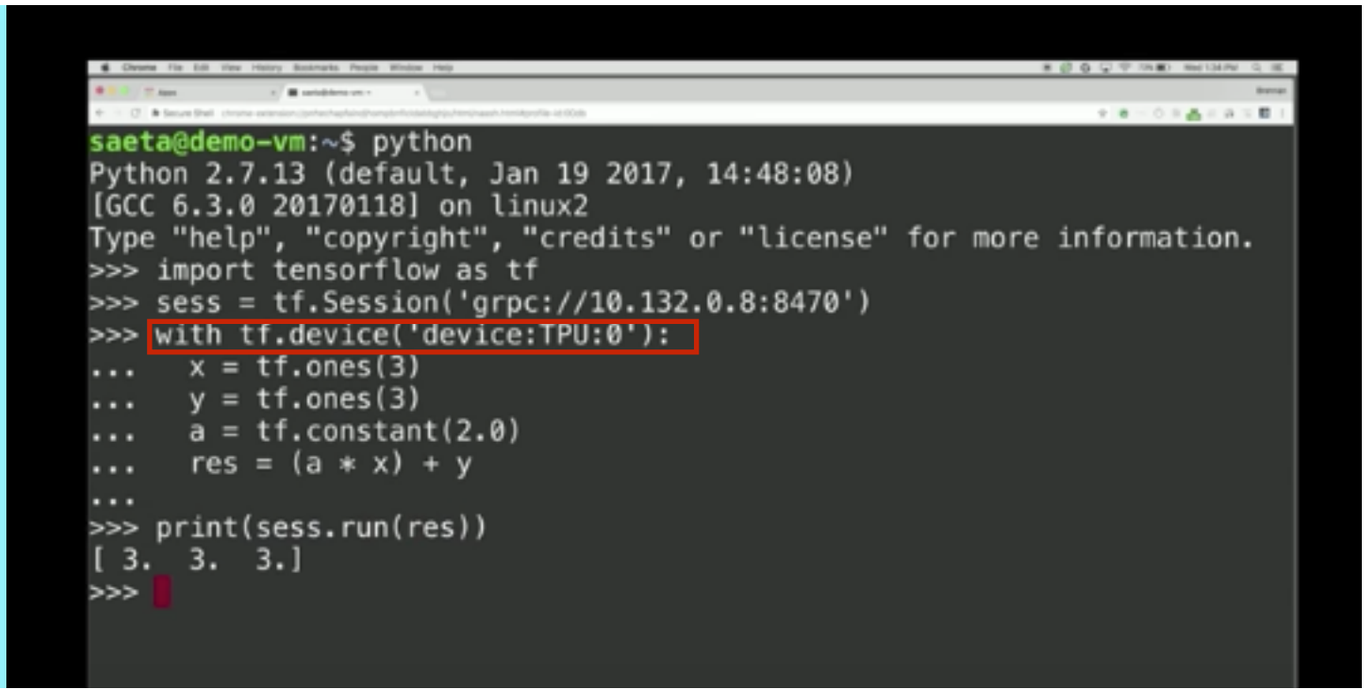
TPU Pod

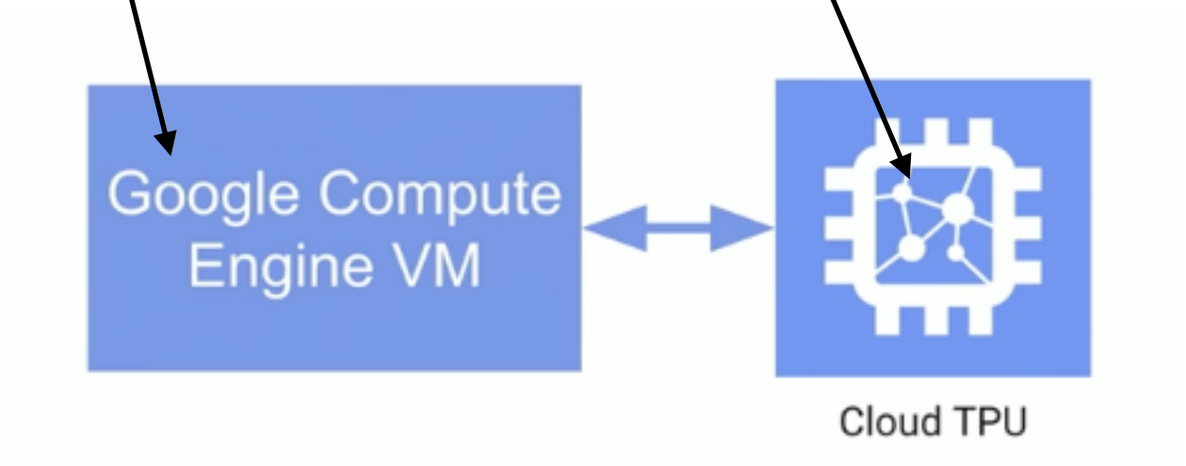


24 hours - 32 GPUs ; 6 hours - 1/8 TPU pod

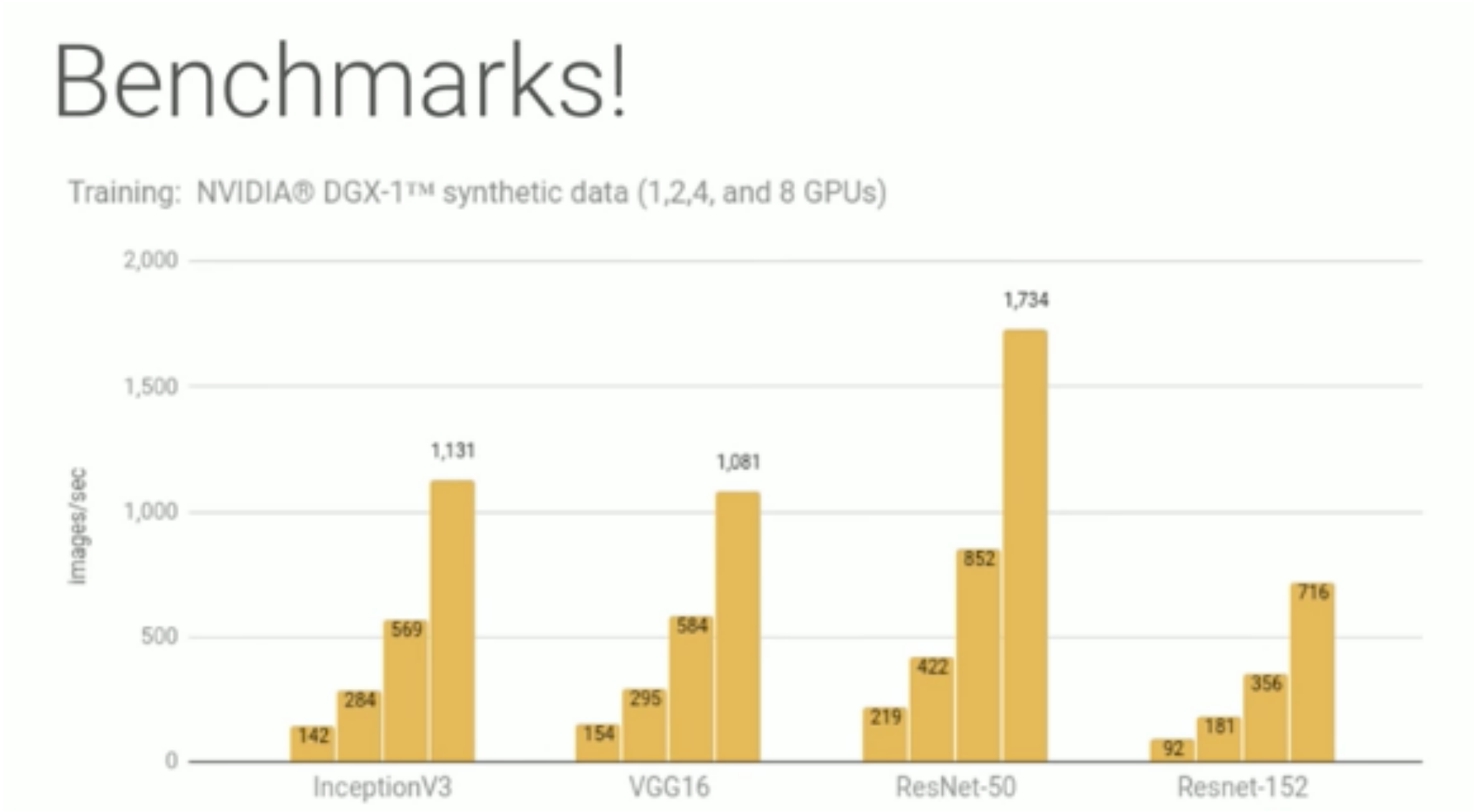
TPU


gcloud compute instances
create demo-vm
gcloud compute tpu
create demo-tpu

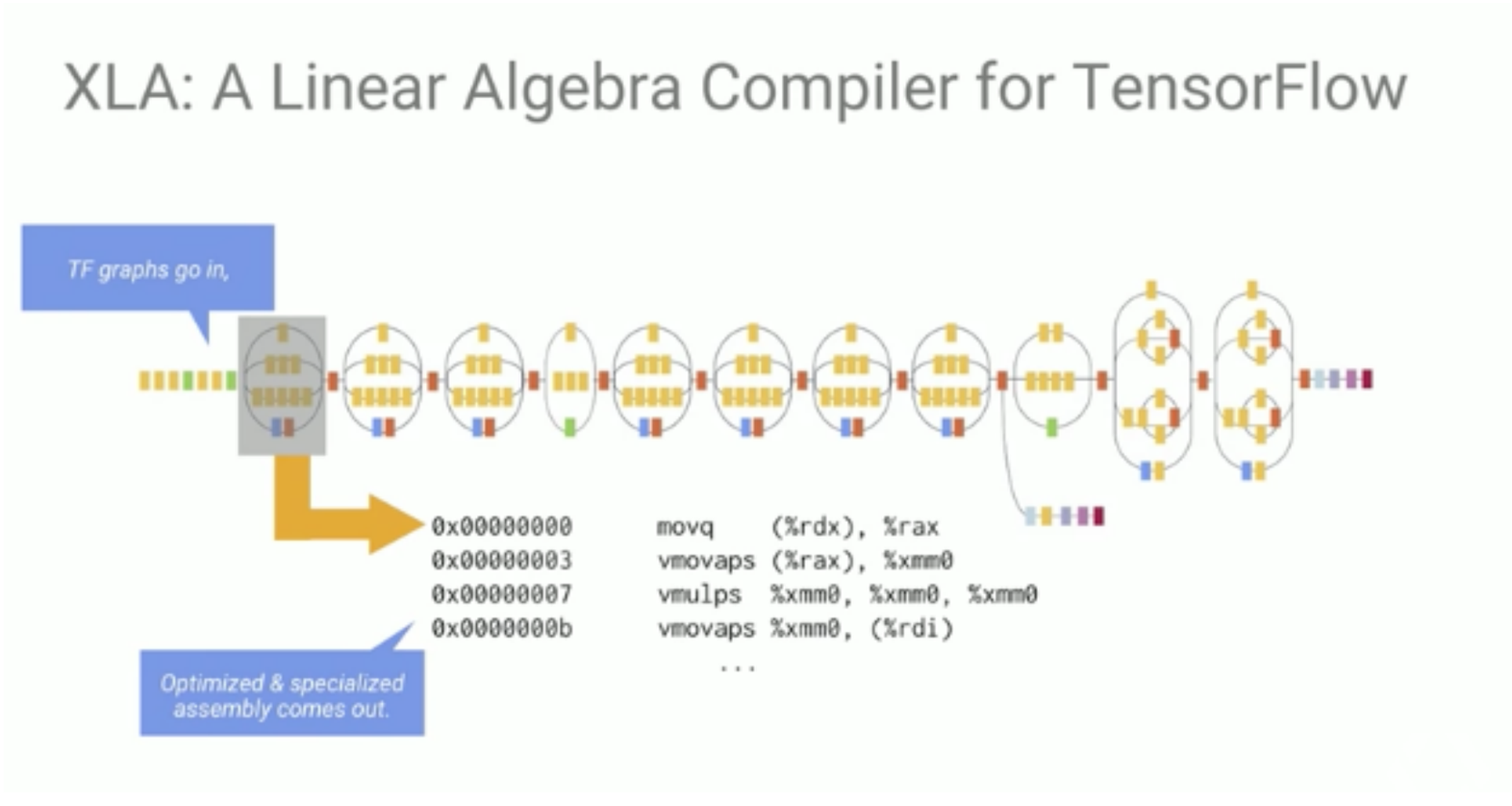

saeta@demo-vm:~$ python
Python 2.7.13 (default, Jan 19 2017, 14:48:08)
[GCC 6.3.0 20170118] on linux2
Type "help", "copyright", "credits" or "license" for more information.
>>> import tensorflow as tf
>>> sess = tf.Session('grpc://10.132.0.8:8470')
>>> with tf.device('device:TPU:0'):
... x = tf.ones(3)
... y = tf.ones(3)
... a = tf.constant(2.0)
... res = (a * x) + y
...
>>> print(sess.run(res))
[3. 3. 3.]
>>>

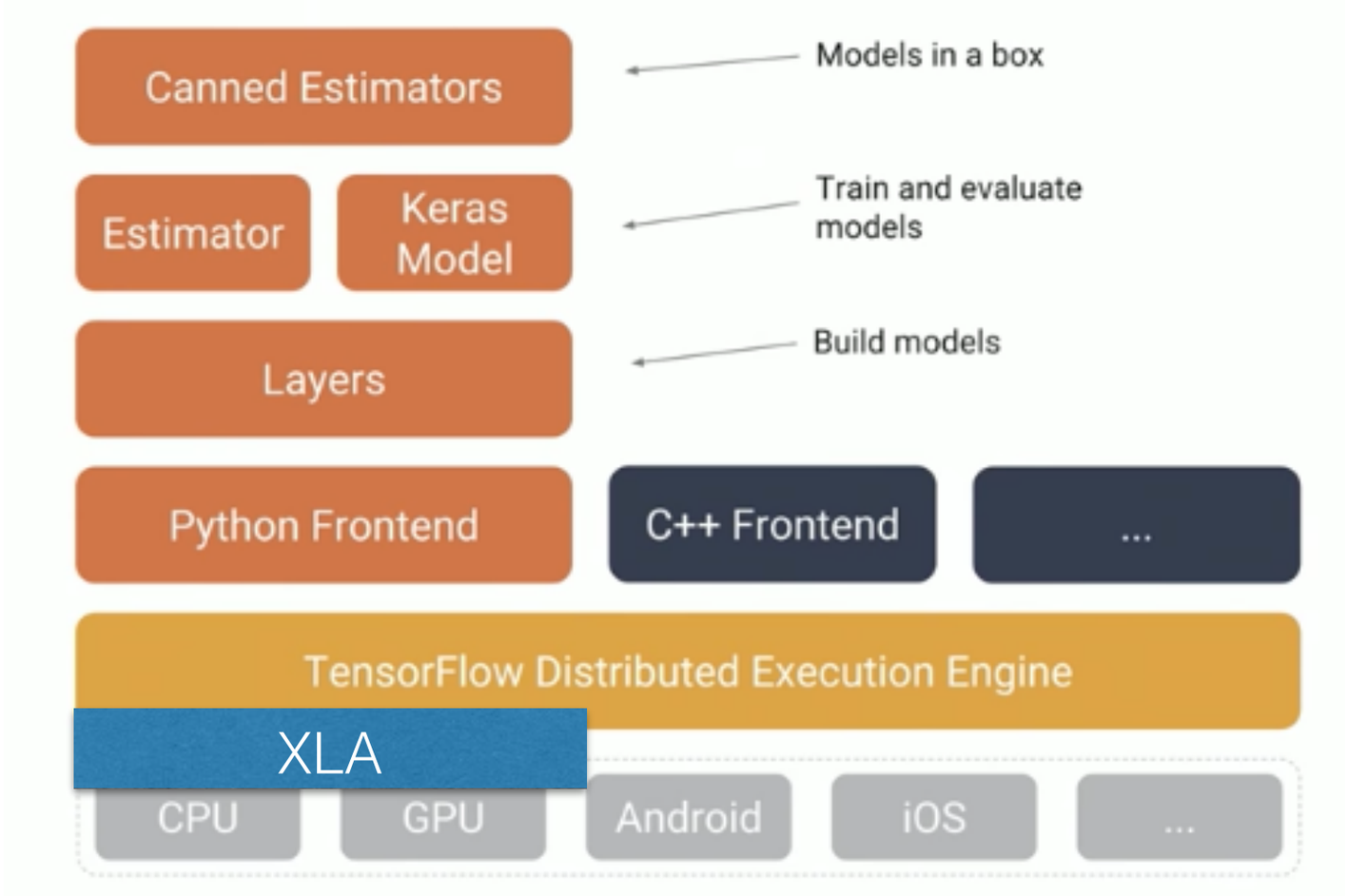

Google Compute Engine VM
Cloud TPU

Acceleration



XLA

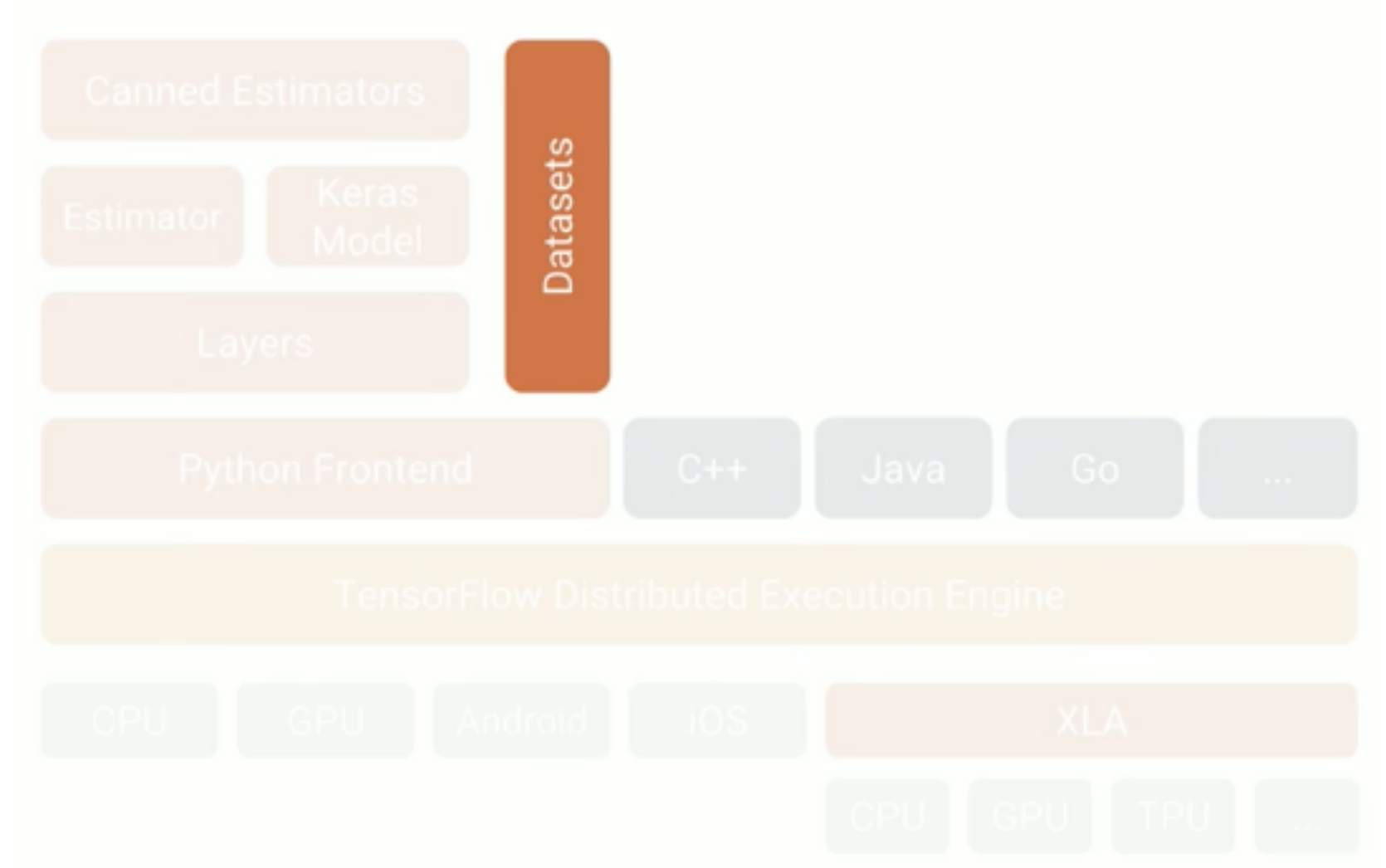

XLA: A Linear Algebra Compiler for TensorFlow
TF graphs go in,
0x00000000 movq (%rdx), %rax
0x00000003 vmovaps (%rax), %xmm0
0x00000007 vmulps %xmm0, %xmm0, %xmm0
0x0000000b vmovaps %xmm0, (%rdi)
...
Optimized & specialized assembly comes out.


Canned Estimators
Models in a box
Estimator
Keras Model
Train and evaluate models
Layers
Build models
Python Frontend
C++ Frontend
...
TensorFlow Distributed Execution Engine
XLA
CPU
GPU
Android
iOS
...

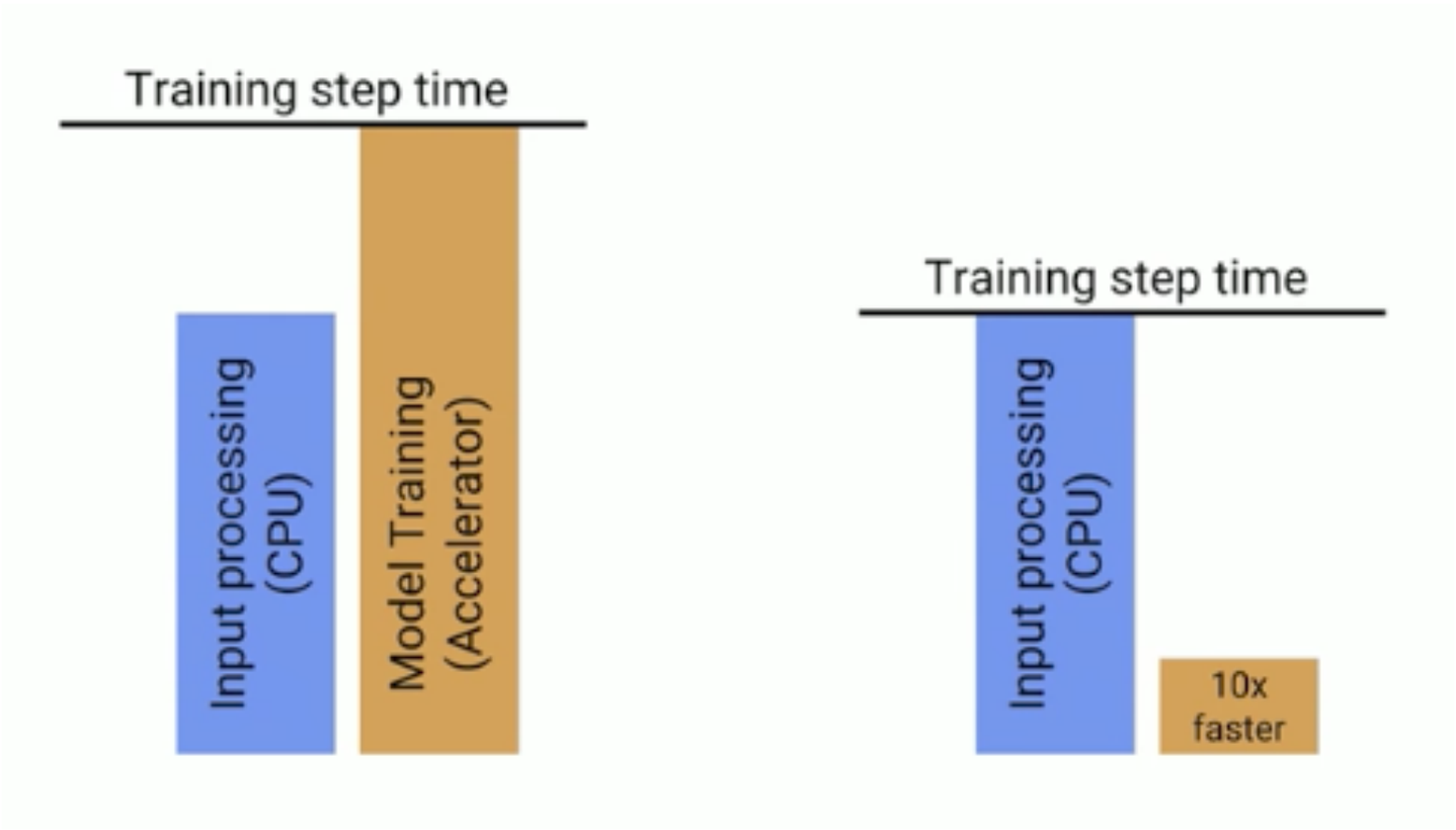
Estimator

```
def main():
  run_config = tpu_config.RunConfig()
  estimator = tpu_estimator.TpuEstimator(
      model_fn=model_fn,
      config=run_config)
  estimator.train(
      input_fn=input_fn,
      max_steps=FLAGS.train_steps)
```

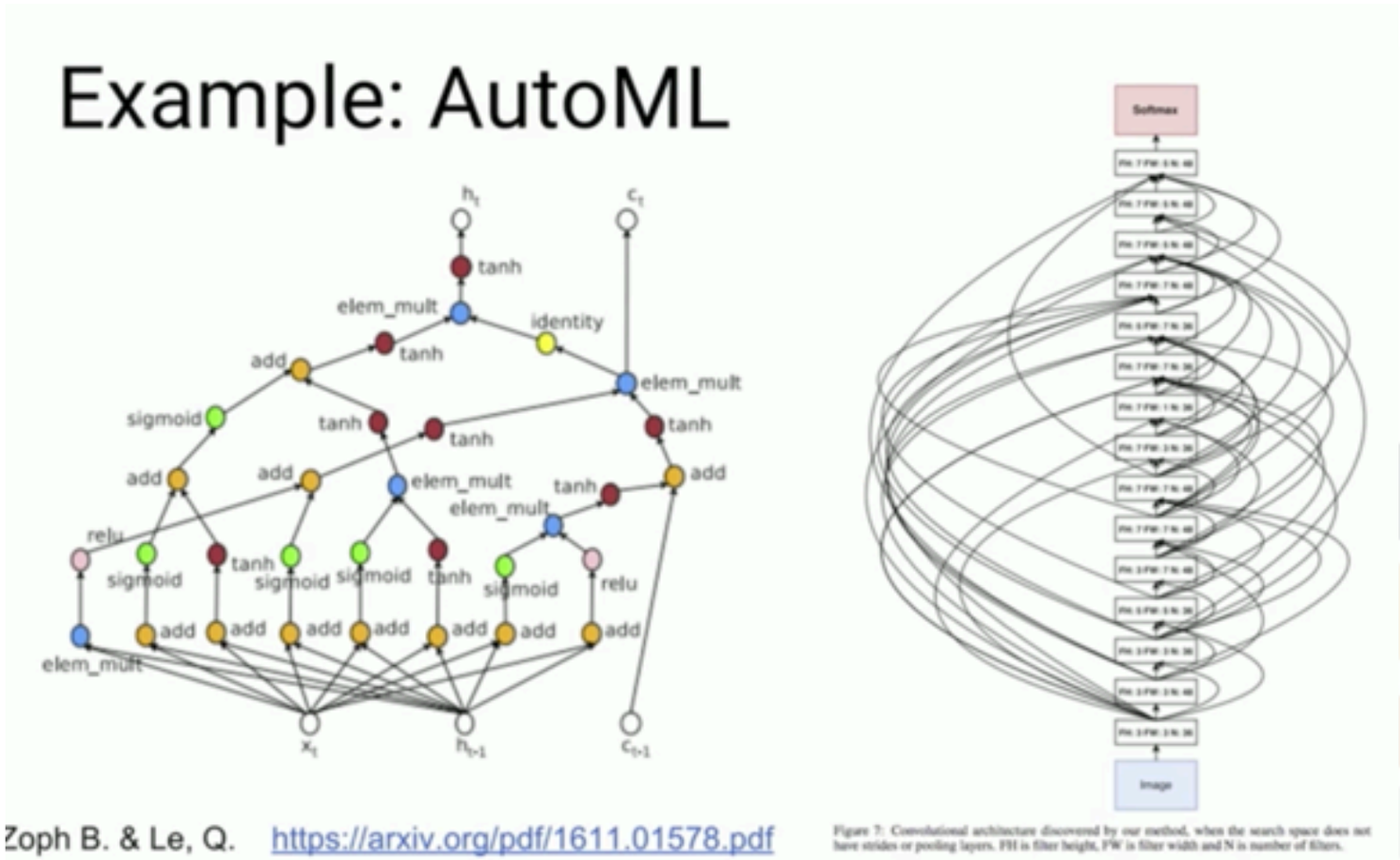
Datasets


Canned Estimators
Estimator
Keras Model
Layers
Datasets
Python Frontend
C++
Java
Go
...
TensorFlow Distributed Execution Engine
CPU
GPU
Android
iOS
XLA
CPU
GPU
TPU
...

Datasets


Training step time
Input processing (CPU)
Model Training (Accelerator)
Training step time
Input processing (CPU)
10x faster

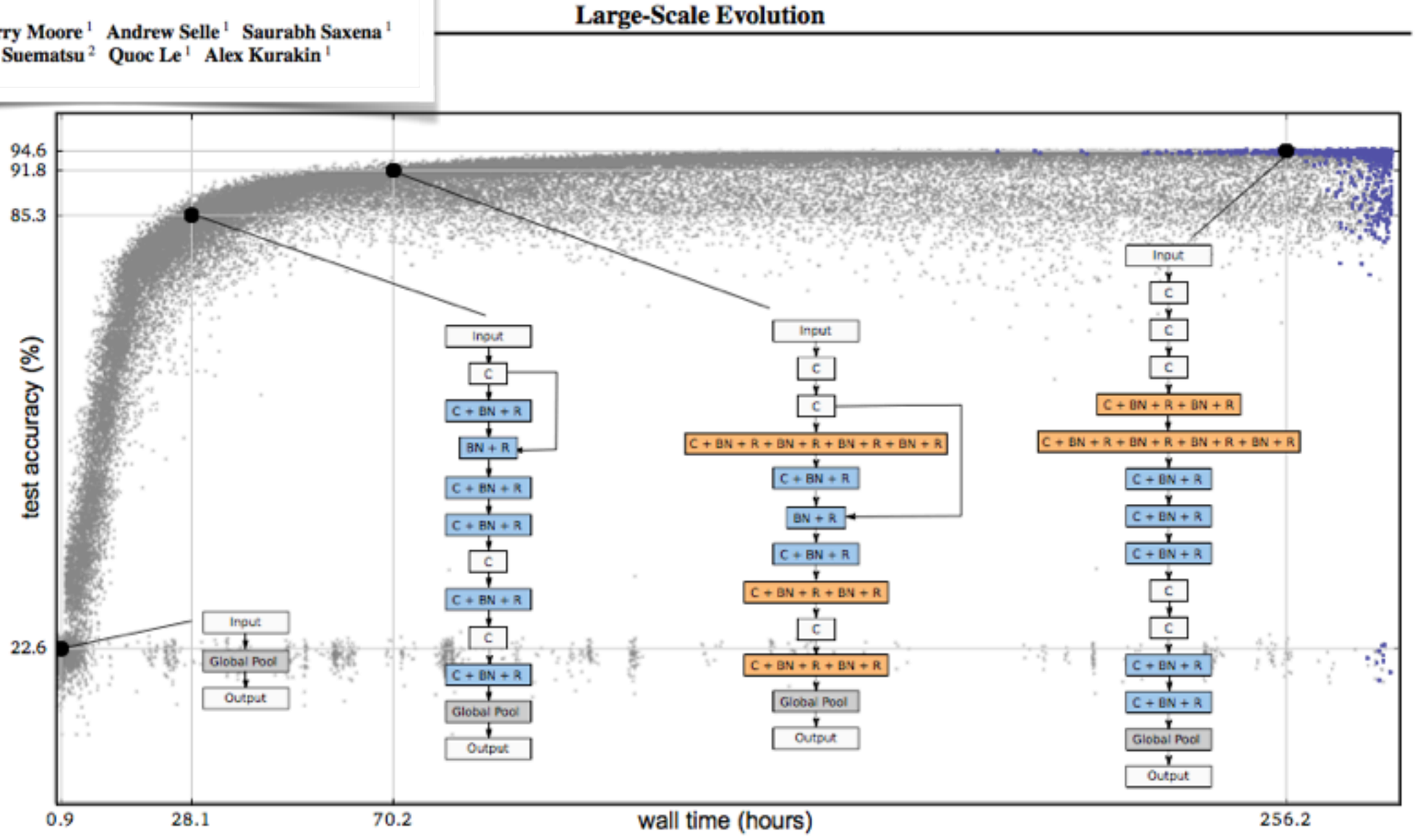
Learn to learn



Learn to learn

Large-Scale Evolution of Image Classifiers

Esteban Real [1] Sherry Moore [1] Andrew Selle [1] Saurabh Saxena [1]
Yutaka Leon Suematsu [2] Quoc Le [1] Alex Kurakin [1]



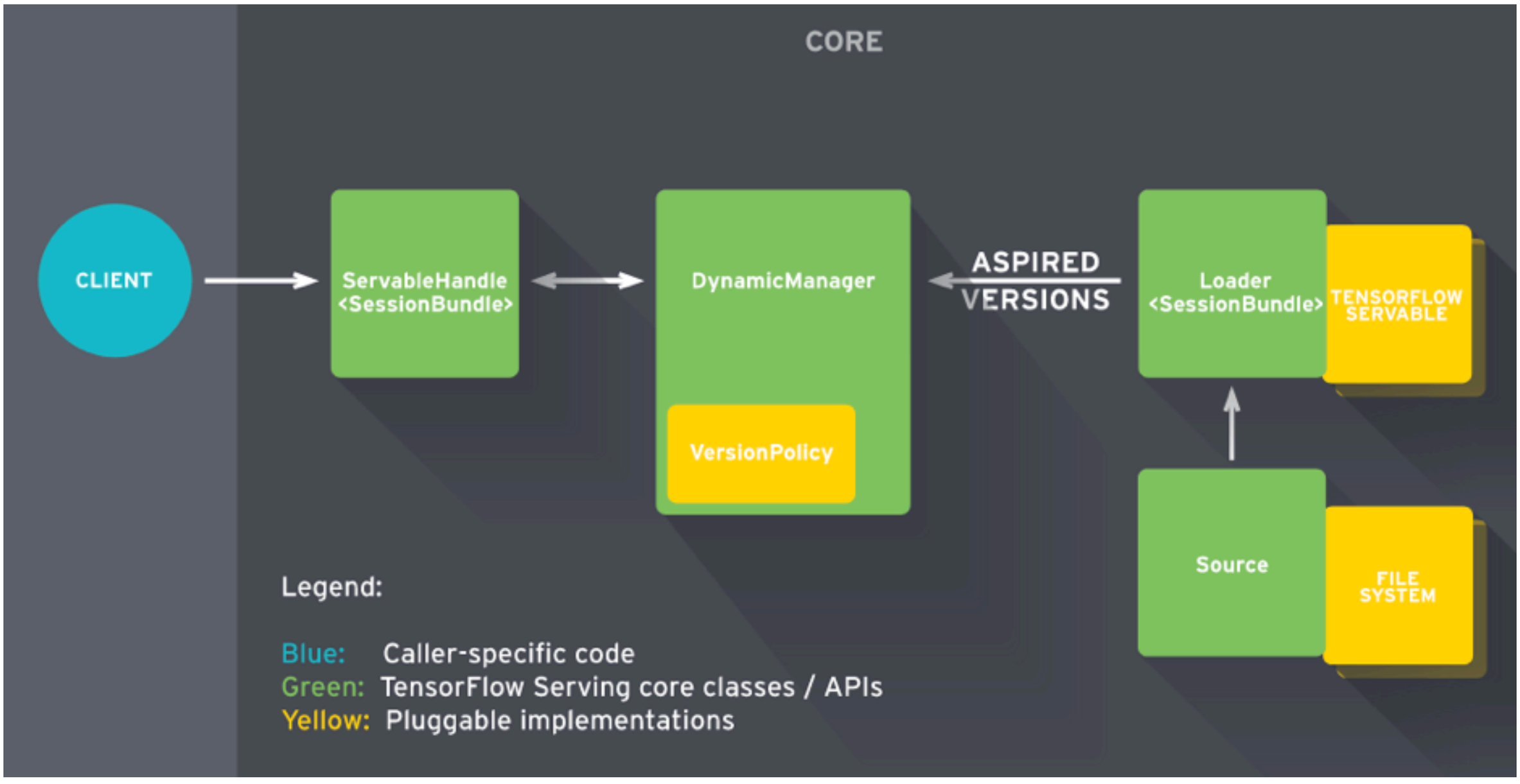
CIFAR-10 and CIFAR-100 datasets

Research Cloud

TensorFlow
RESEARCH CLOUD

https://services.google.com/fb/forms/tpusignup/

From Research to Production TensorFlow serving



Vision

Pushing the boundaries of Machine Learning

"Computer vision is the killer application of AI"

– Feifei Li

Codelab

22 min

Android & TensorFlow: Artistic Style Transfer

START

macd
Updated Jun 2, 2017

55 min

TensorFlow For Poets

START

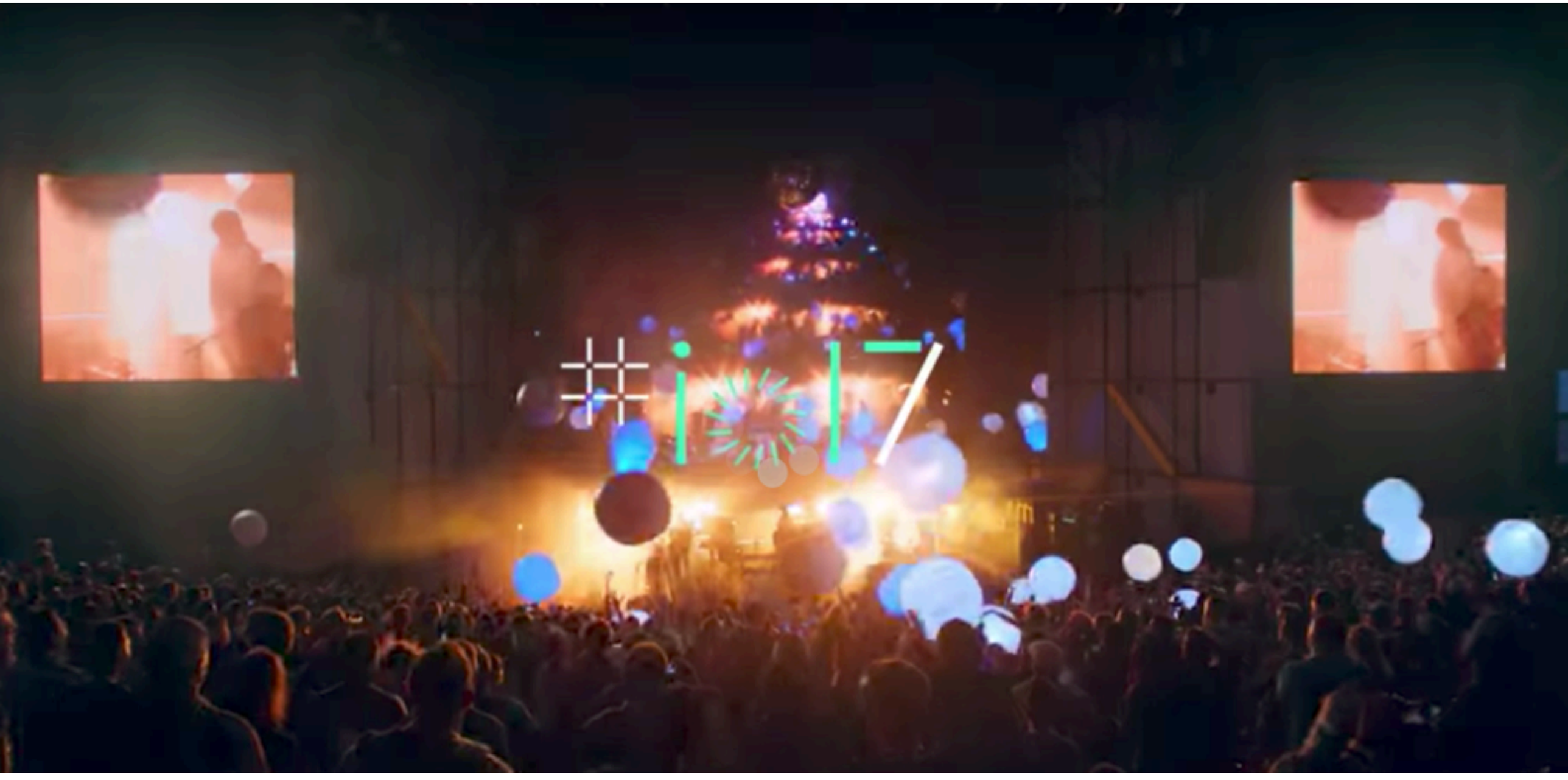
Updated May 16, 2017

55 min

TensorFlow for Poets 2: Optimize for Mobile

START

markdaoust
Updated May 17, 2017



Thanks

lydhroye@gmail.com