

Introduction to Tensorflow

Subtitle

Deep Learning Libraries



- Tensorflow (by Google)



- Keras (on Tensorflow, MXNet, DL4J, or Microsoft Cognitive Toolkit)



- PyTorch (by Facebook)



- Caffe (by Berkeley Vision and Learning Center)



- MXNet (by Amazon)
- Microsoft Cognitive Toolkit



- Deeplearning4J



- Caffe2 (by NVIDIA and Facebook)

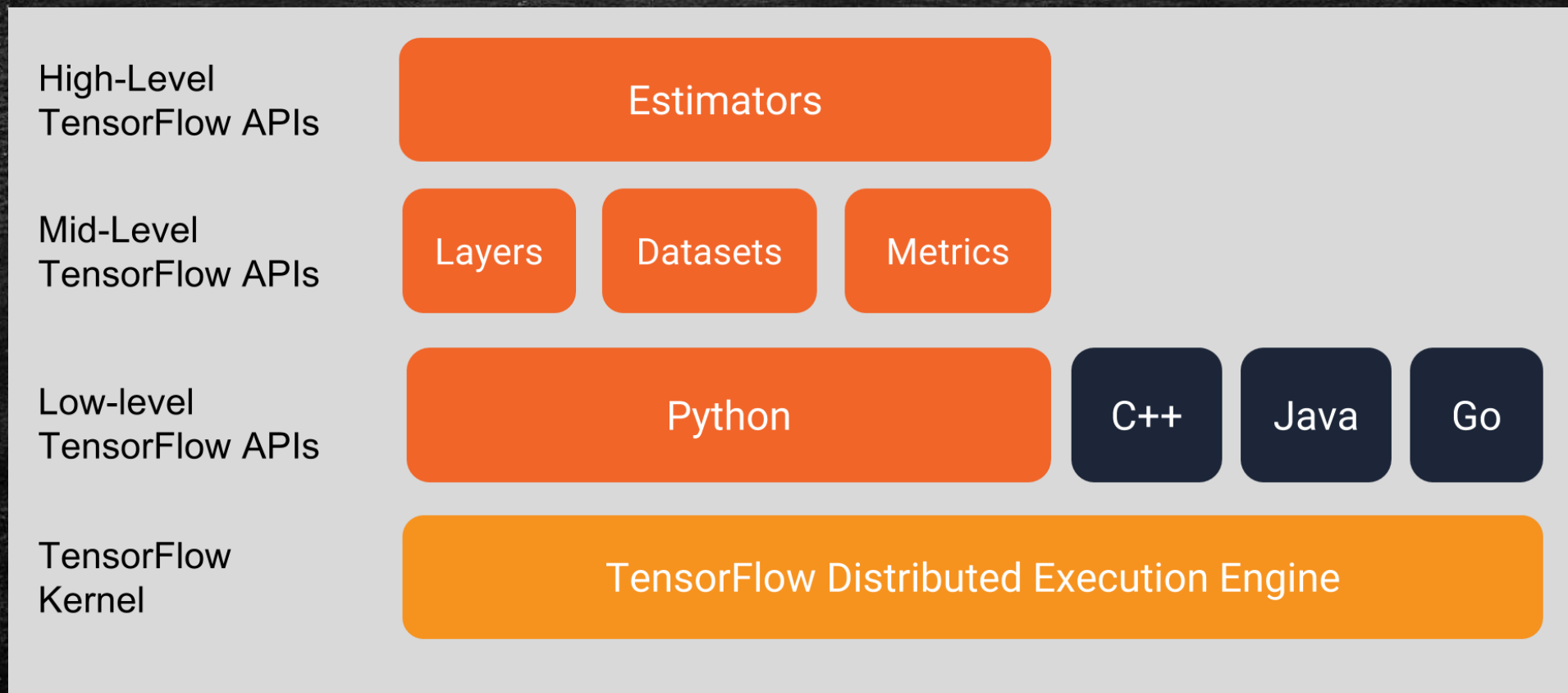
Comparison of Deep Learning Libraries

	User Community	Flexibility	Scalability	Performance	Deployment
Tensorflow	+++++	+++	+++	++	+++++
PyTorch	++	+++++	++	+++++	++
MXNet	++	++	+++++	+++++	+++
Caffe	+++	++	++	+++	+++
DL4J	+	+++	+++	+++	+++++

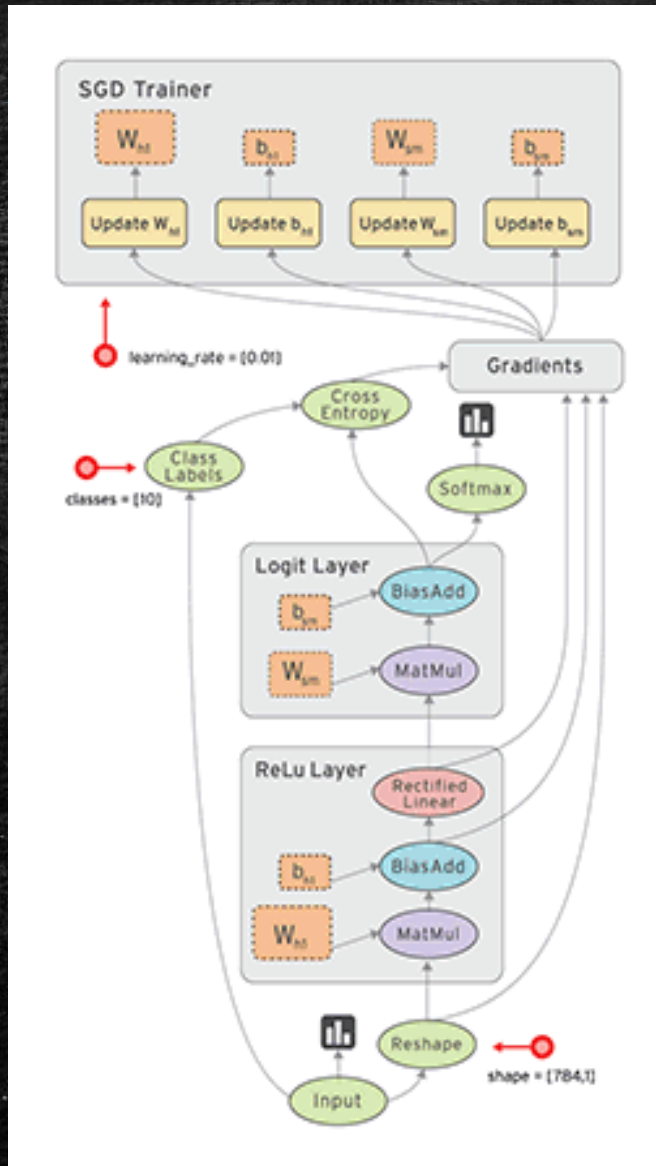
Why Tensorflow ?

- Large user community
 - >92000 stars on Github as of March, 2018
 - >24000 Tensorflow questions on StackOverflow
- Plenty of online learning material
- Lots of examples on Github
- Lots of pre-trained models
- Easily deployed to different devices

Tensorflow programming environment

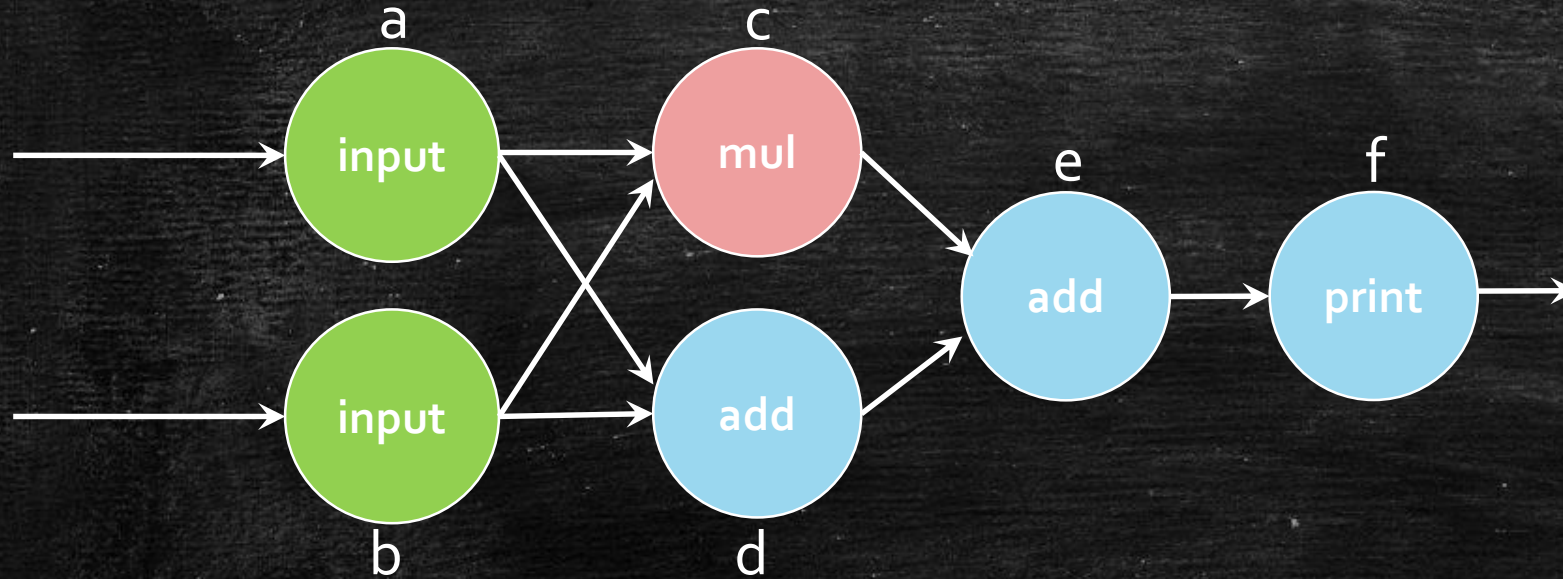


Dataflow graph in Tensorflow



- Advantages of a dataflow model
 - Parallelism
 - Distributed execution
 - Compilation
 - Portability

An example of Tensorflow Graph



```
a = tf.placeholder(tf.float32, None, name='a')
b = tf.placeholder(tf.float32, None, name='b')
c = tf.multiply(a,b)
d = tf.add(a, b)
e = tf.add(c, d)
f = tf.Print(e, [a, b, c, d, e])
```

If we run f :
with tf.Session() as sess:
 sess.run(f, feed_dict={a:1, b:2})
We'll see in *stderr*:
[1][2][2][3][5]

If we run c :
with tf.Session() as sess:
 print(sess.run(c, feed_dict={a:1, b:2}))
We'll see:
2

Tensorflow Session

- `tf.Session` class represents a connection between client program (typically a python program) and the tensorflow C++ runtime.
- A `tf.Session` object provides access to devices in the local machine and remote devices using distributed tensorflow runtime.