Introduction to TensorFlow

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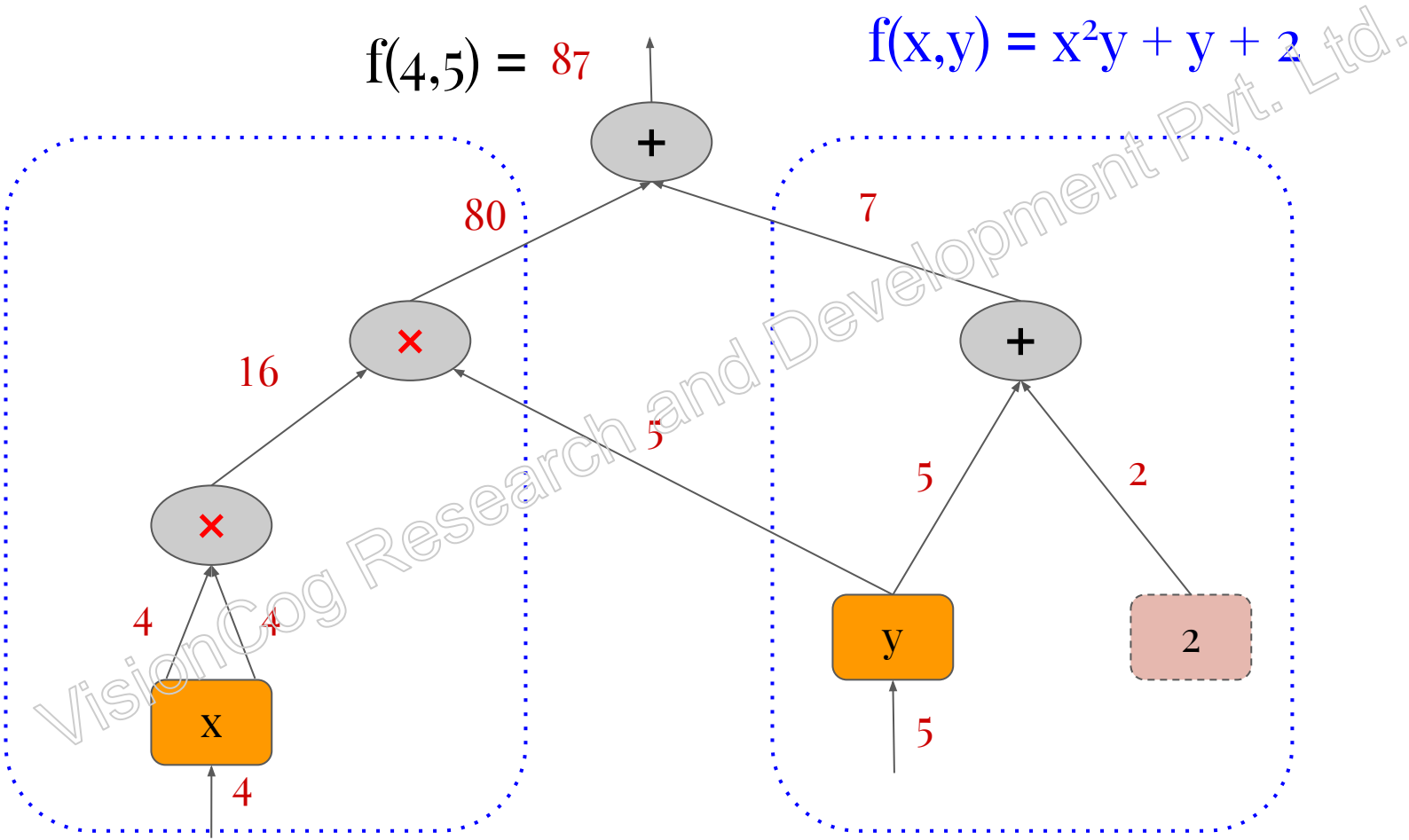
Tensorflow

- Open source library for numerical computation by **Google**
- Well suited for **large scale** Machine Learning
- Basic principle : ***Graph Computation*** defined using **Python**
- Run efficiently on a **C++** library
- Can run in **parallel** across multiple CPU or GPU
- Also supports **distributed** computing - runs across several servers

TensorFlow


f(4,5) = 87
f(x,y) = x²y + y + 2
+
80
7
×
+
16
5
5
2
×
4
4
y
2
x
5
4
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TensorFlow

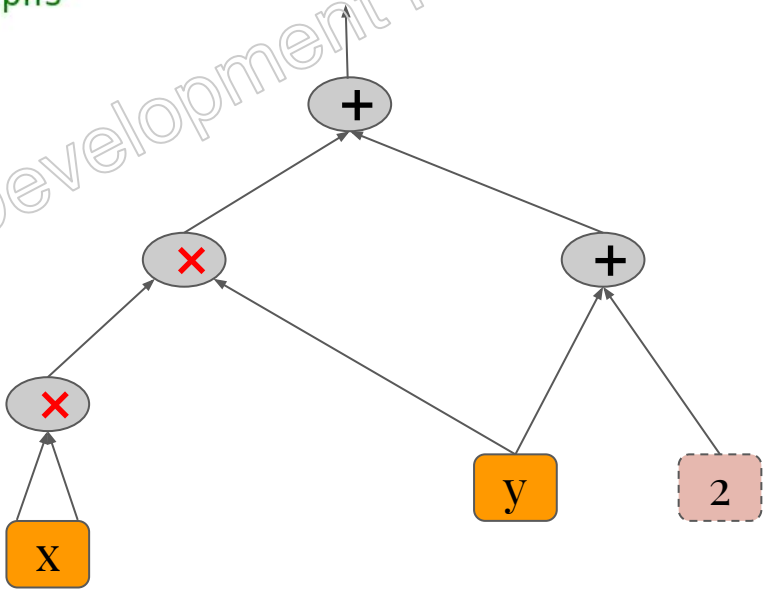
$$f(x,y) = x^2y + y + 2$$

```
# https://www.tensorflow.org/tensorboard/r2/graphs

# Install TensorFlow
try:
  # %tensorflow_version only exists in Colab.
  %tensorflow_version 2.x
except Exception:
  pass

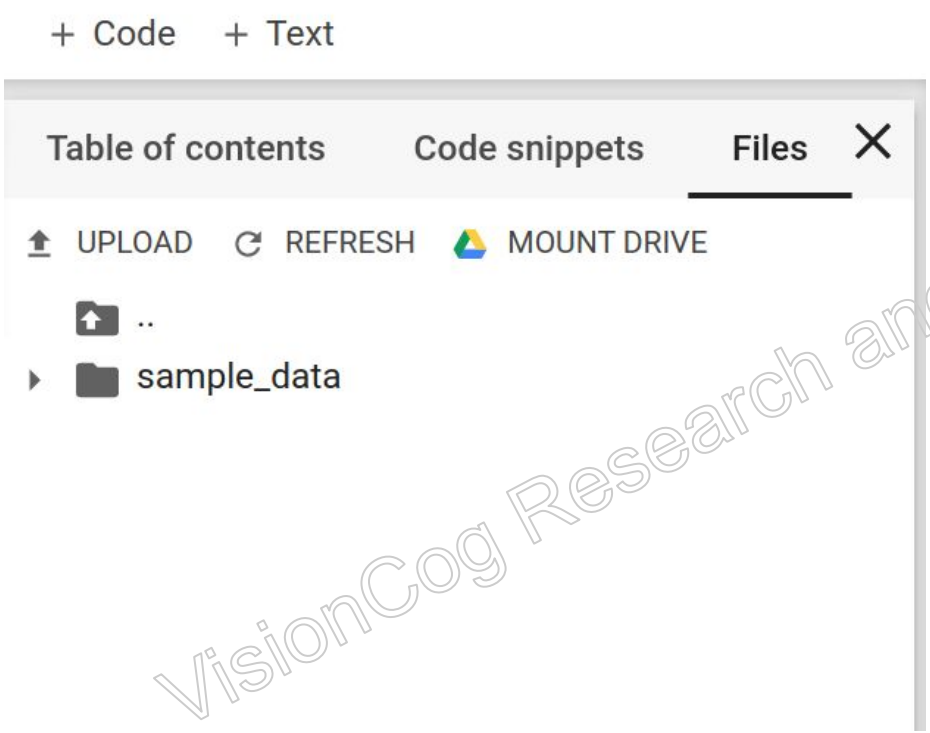
import tensorflow as tf
# TensorFlow 2.x selected.

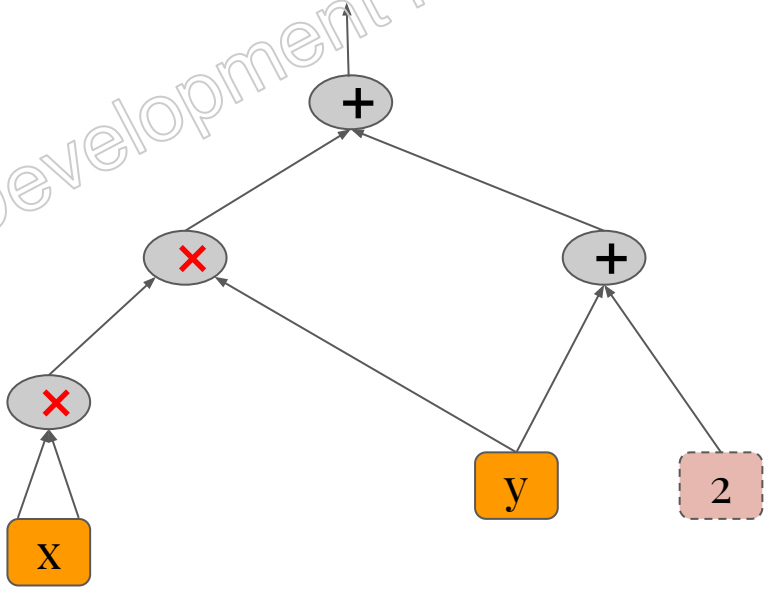
print(tf.__version__)
# 2.0.0-rc1
```



TensorFlow

$$f(x,y) = x^2y + y + 2$$





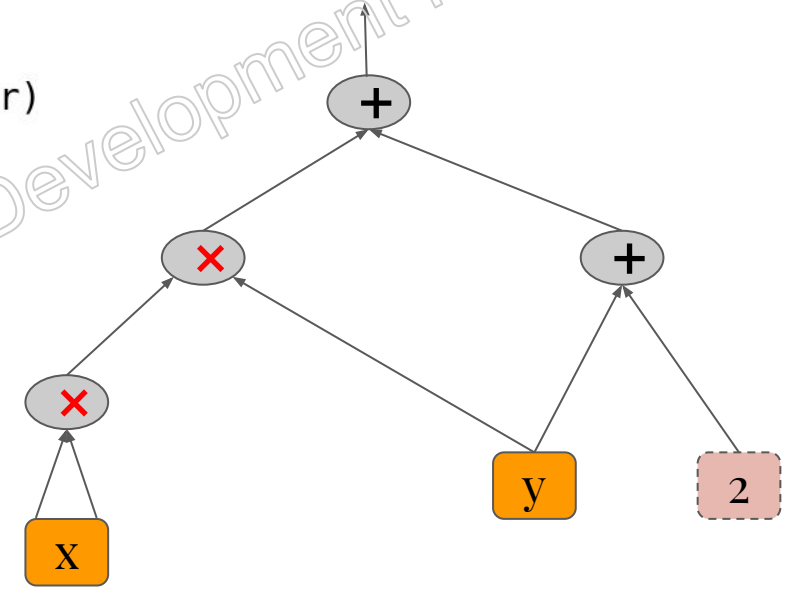
TensorFlow

$$f(x,y) = x^2y + y + 2$$

```
# Set up logging.
logdir = 'outGraph/'
writer = tf.summary.create_file_writer(logdir)

x = tf.Variable(4, name="x")
y = tf.Variable(5, name="y")

@tf.function
def my_func(x, y):
    f = x*x*y + y + 2
    return f
```



TensorFlow

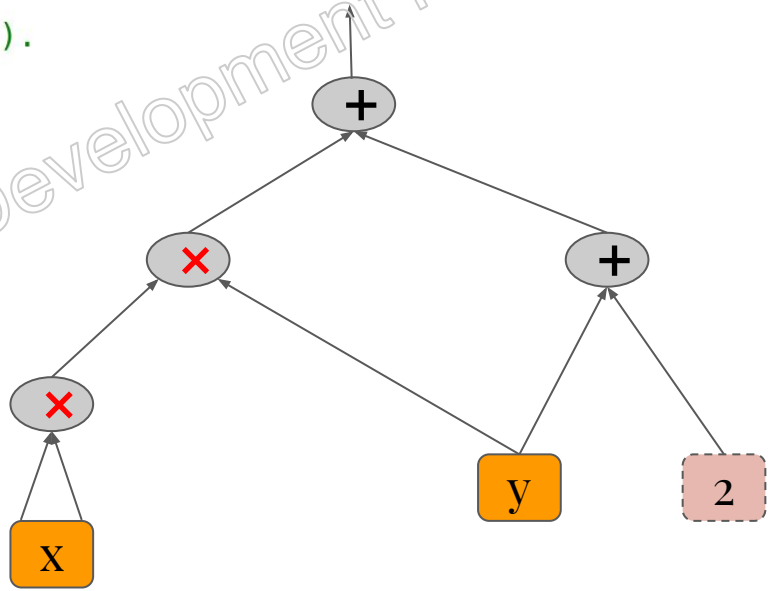
$$f(x,y) = x^2y + y + 2$$

```
# Bracket the function call with
# tf.summary.trace_on() and tf.summary.trace_export().
tf.summary.trace_on(graph=True, profiler=True)

# Call only one tf.function when tracing.
z = my_func(x,y)

print(z)
# tf.Tensor(87, shape=(), dtype=int32)

with writer.as_default():
  tf.summary.trace_export(
      name="my_graph",
      step=0,
      profiler_outdir=logdir)
```



TensorFlow

$$f(x,y) = x^2y + y + 2$$

+ Code + Text

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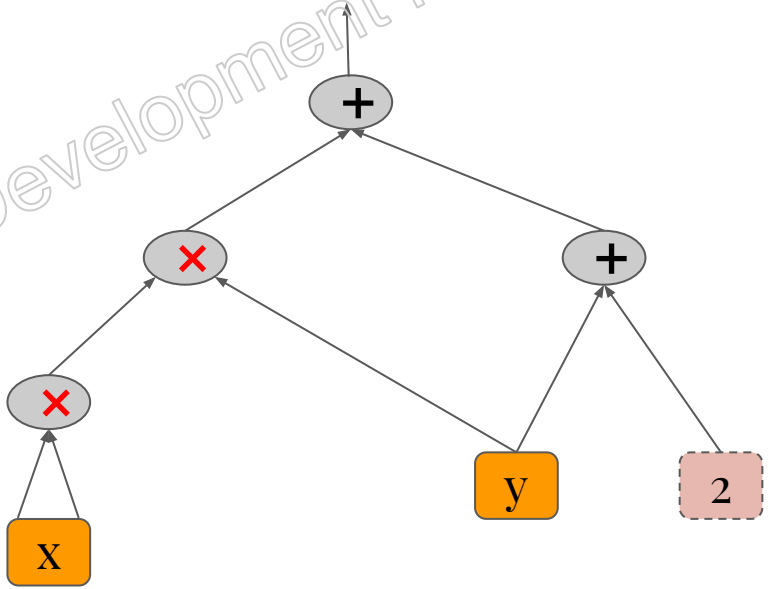
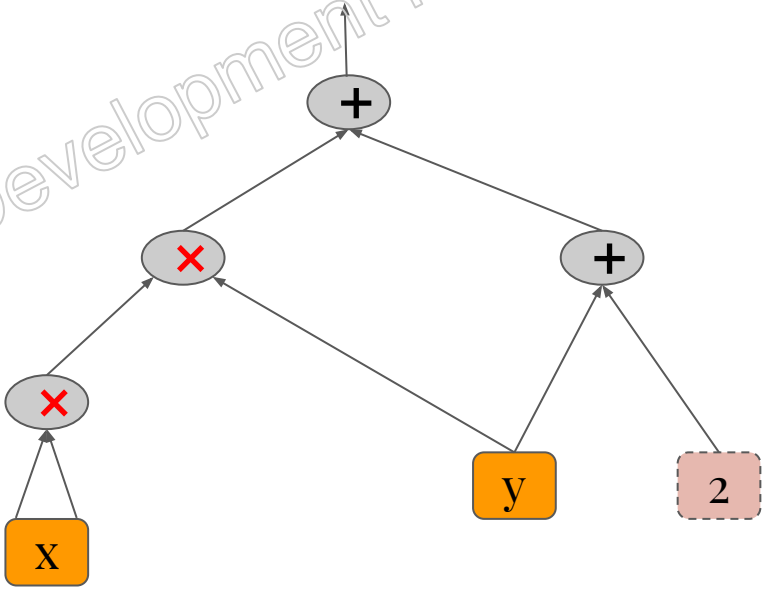
- outGraph
  - plugins
    - profile
    - events.out.tfevents.1569770488.8a045053...
    - events.out.tfevents.1569770491.8a045053...
  - sample_data



TensorFlow

$$f(x,y) = x^2y + y + 2$$

```
%load_ext tensorboard
%tensorboard --logdir outGraph/
```



TensorFlow

```
%load_ext tensorboard
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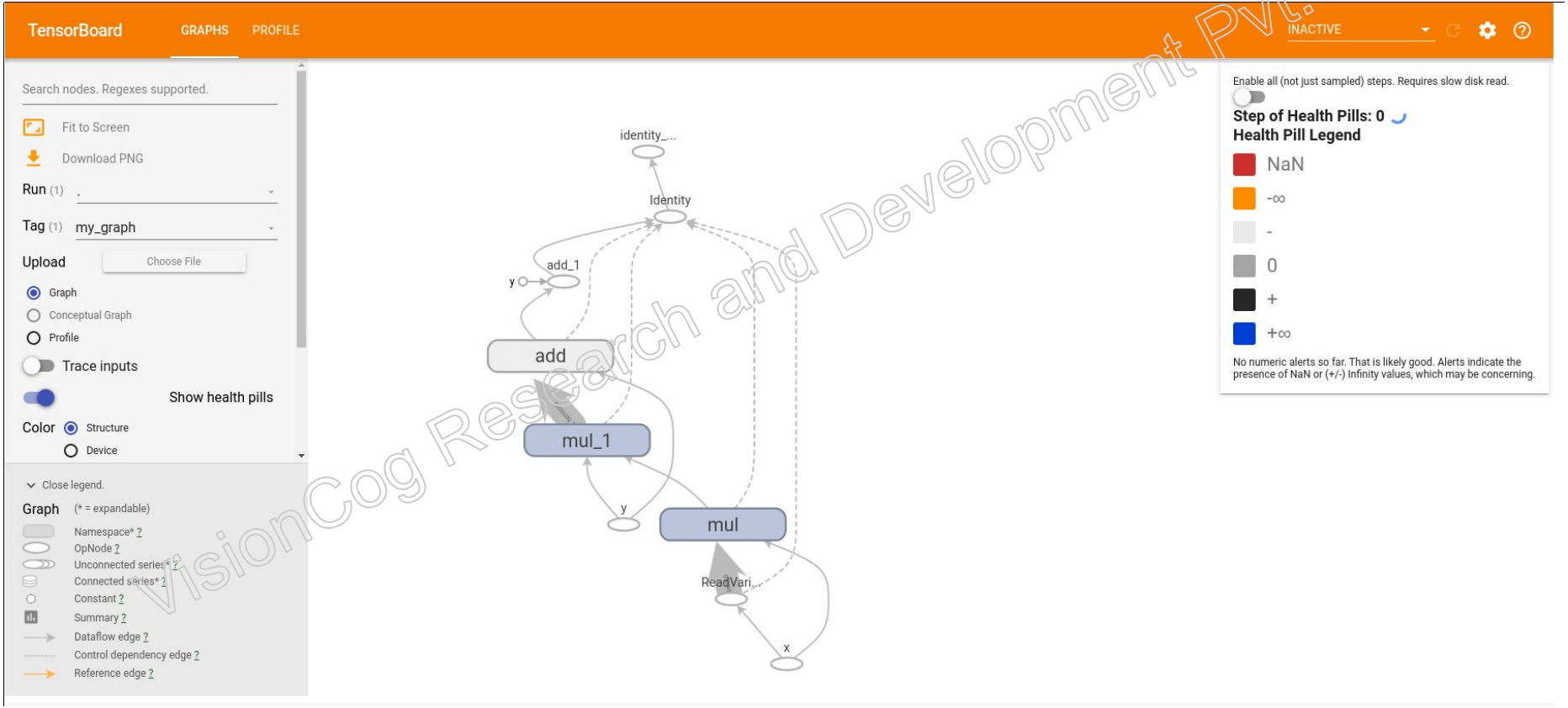

TensorFlow