TensorFlow Build Guide

v1.0

1. Overview

This article introduces how to build TensorFlow on Linux OS, including CPU-Only-version and OpenCL-version.

2. Build CPU-Only Version

2.1. Overview

TensorFlow can use CPU extension instructions for higher performance, taking advantage of SSE, AVX, FMA an so on.

2.2. Pre-Requisites

For Linux OS You'll need the following installed on your machine

JDK 8 (Oracle JDK or Open JDK)

Python (2.x or 3.x)

git

gcc or clang (newer version)

bazel

biuld-essential

2.3. Build

a)

3. Build OpenCL Version

3.1. Overview

TensorFlow can take advantage of OpenCL to improve performance by utilizing all the computing resources in the system.

3.2. Pre-Requisites

In addition to 1.2, you'll also need the following installed on your machine

clinfo

OpenCL drivers

computecpp for SYCL (Ubuntu 16+ or CentOS7.2+ recommend for it)

3.3. Install OpenCL Driver

For Intel CPU&GPU, you will download opencl driver from https://software.intel.com/en-us/intel-opencl/download , and install it following the instructions in README text.

For example,

i. Download driver file “SRB5.0_linux64.zip”, and then unzip it.

ii. Install all rpm package in it, or extract *.tar.xz to root director.

iii. Run command: sudo ldconfig

iv. Test by clinfo, Input command in terminal: clinfo for test

v. Drivers had been installed in these paths (on Ubuntu):

"/etc/ld.so.conf.d/libintelopencl.conf"

"/etc/OpenCL/vendors/intel.icd"

"/etc/profile.d/libintelopencl.sh"

"/opt/intel/opencl"

3.4. Install computecpp

Download computecpp from https://developer.codeplay.com/computecppce/latest/supported-platforms .

Important : Create link ***/usr/local/lib/libComputeCpp.so*** to ***/usr/local/computecpp/lib/libComputeCpp.so*** .

3.5. Install computecpp

Download computecpp from https://developer.codeplay.com/computecppce/latest/supported-platforms .

Important : Create link ***/usr/local/lib/libComputeCpp.so*** to ***/usr/local/computecpp/lib/libComputeCpp.so*** .

3.6. Clone repository

Run following command:

```
1. git clone -b <tag> --recurse-submodules
   https://github.com/tensorflow/tensorflow
```

Note: Argument: **-recurse-submodules** is necessary for getting dependent packages.

3.7. Install Bazel

a) Install JDK 8 with apt

b) Run following commands to install bazel:

```
1. echo "deb [arch=amd64] http://storage.googleapis.com/bazel-apt stable
   jdk1.8" | sudo tee /etc/apt/sources.list.d/bazel.list
2. curl https://bazel.build/bazel-release.pub.gpg | sudo apt-key add -
3. sudo apt-get update
4. sudo apt-get install bazel
```

3.8. Build with bazel

Run configuration script in the source directory:

```
1. ./configure
```

You need type “y” when it ask if you want to build with OpenCL(SYCL) and input the installation directory of ComputeCpp.

Then run the following command to build with bazel:

```
1. bazel build --config=opt --config=mkl –config=sycl
   //tensorflow/tools/pip_package:build_pip_package
```

Note: with flag **mkl** for compiling with intel Math Kernel lib and flag **sycl** for compiling with opencl(by SYCL). After running configure script, the build flag “-march=native” will be setted automaticlly which will optimize according to the features of the native CPU (e.g. sse4.1/sse4.2, avx2, FMA) to improve the performance.

Important: **Maybe**, it will failed by network block, you need download all packages by yourself. And modify the URL in **//tensorflow/WORSPACE** and

//tensorflow/tensorflow/workspace.bzl to make them point to your own server address.

3.9. Deal issue of Eigen for OpenCL-version

In order to fix errors raised during the build with Eigen, please use fixed eigen package for SYCL instead.

Download it from: https://bitbucket.org/mehdi_goli/opencl.

3.10. Output Package

Run following command:

```
1. bazel-bin/tensorflow/tools/pip_package/build_pip_package
   /tmp/tensorflow_pkg
```

Important: do not modify the name of the package after packaging, otherwise, it can't be installed with pip.

3.11. issues

```
1. 2017-12-19 15:31:35.133802:
   W ./tensorflow/core/common_runtime/sycl/sycl_device.h:49] No OpenCL GPU
   found that is supported by ComputeCpp, trying OpenCL CPU
2. 2017-12-19 15:31:35.308445:
   I ./tensorflow/core/common_runtime/sycl/sycl_device.h:66] Found following
   OpenCL devices:
3. 2017-12-19 15:31:35.308839:
   I ./tensorflow/core/common_runtime/sycl/sycl_device.h:68] id: 0, type: CPU,
   name: Intel(R) Core(TM) m3-7Y30 CPU @ 1.00GHz, vendor: Intel(R) Corporation,
   profile: FULL_PROFILE
```