Tornado Installation Notes

1. Install a JVMCI enabled JVM.

Note: this is a special OpenJDK especially for Tornado

Prebuilt binaries are available here:

- OSX 10.10 https://www.dropbox.com/s/qmn78qt5myww6ku/jdk1.8.0_73-osx-10.10.tgz?dl=0
- Linux 64-bit https://www.dropbox.com/s/wbb3wy3e634nvby/jdk1.8.0_91-linux64.tgxz?dl=0

Extract it and set JAVA_HOME to point to it.

```
$ tar xvzf jdk1.8.0_73-osx-10.10.tgz
$ export JAVA_HOME=$PWD/jdk1.8.0_73-graal/
```

2. Install the Tornado binary SDK

Grab it from here: https://www.dropbox.com/s/lx6ne71qtnjfeom/tornado-sdk-0.0.2.tgz?dl=0

```
$ tar xvzf tornado-sdk-0.0.2.tgz
$ cd tornado-sdk-0.0.2/etc/
$ vi tornado.env

<you must set JAVA_HOME to the path of the JDK installed in step 1.>
<you must set TORNADO_ROOT to the path that the Tornado SDK was
extracted into.>

$ . tornado.env
```

Build The Drivers

```
$ cd drivers/opencl
$ autoreconf -f -i -s
$ ./configure --prefix=${PWD} --with-jdk=${JAVA_HOME}
$ make clean
$ make
$ make install
```

3. Query the available devices

```
$ tornado tornado.drivers.opencl.OpenCL
usage: OpenCL <platform> <device>

[0]: platform: Apple
[0:0] device: Intel(R) Core(TM) i7-4850HQ CPU @ 2.30GHz
[0:1] device: Iris Pro
[0:2] device: GeForce GT 750M
```

To view specific details of a specific device pass the platform and device indices tornado.

```
$ tornado tornado.drivers.opencl.OpenCL 0 1
15:41:35.205 [main] WARN  tornado.drivers.opencl.OCLDeviceContext -
device requires bump buffer: Iris Pro
id=0x1024500, name=Iris Pro, type=CL_DEVICE_TYPE_GPU, available=true
freq=1.2 GHz, max compute units=40
global mem. size=1.5 GiB, local mem. size=64.0 KiB
extensions:
  cl_APPLE_SetMemObjectDestructor
  cl_APPLE_ContextLoggingFunctions
  cl_APPLE_clut
  cl_APPLE_query_kernel_names
  cl_APPLE_gl_sharing
  cl_khr_gl_event
  cl_khr_global_int32_base_atomics
  cl_khr_global_int32_extended_atomics
  cl_khr_local_int32_base_atomics
  cl_khr_local_int32_extended_atomics
  cl_khr_byte_addressable_store
  cl_khr_image2d_from_buffer
  cl_khr_gl_depth_images
  cl_khr_depth_images
  cl_khr_3d_image_writes
unified memory   : true
device vendor    : Intel
device version   : OpenCL 1.2
driver version   : 1.2(Sep 25 2016 23:45:03)
OpenCL C version : OpenCL C 1.2
Endianess        : little
address size     : 64
```

4. Run the HelloWorld example

```
[Optional: load tornado environment settings on first use]
$ . etc/tornado.env

$ tornado tornado.examples.HelloWorld
tornado[  0,  0,  0]> hello
tornado[  2,  0,  0]> hello
tornado[  3,  0,  0]> hello
tornado[  4,  0,  0]> hello
tornado[  5,  0,  0]> hello
tornado[  6,  0,  0]> hello
tornado[  1,  0,  0]> hello
tornado[  7,  0,  0]> hello
```

To change the target device you need to use the enumeration provided in step 3. e.g. <platform:device>.

To force all tasks within a task-schedule, called “s0” to use a specific device use the following.

```
$ tornado -Ds0.device=0:1 tornado.examples.HelloWorld
tornado[  0,  0,  0]> hello
tornado[  2,  0,  0]> hello
```

```
tornado[  3,  0,  0]> hello
tornado[  4,  0,  0]> hello
tornado[  5,  0,  0]> hello
tornado[  6,  0,  0]> hello
tornado[  1,  0,  0]> hello
tornado[  7,  0,  0]> hello
```

To force a specific task, “t0”, within the task-schedule “s0” to use a specific device do the following.

```
$ tornado -Ds0.t0.device=0:1 tornado.examples.HelloWorld
tornado[  0,  0,  0]> hello
tornado[  2,  0,  0]> hello
tornado[  3,  0,  0]> hello
tornado[  4,  0,  0]> hello
tornado[  5,  0,  0]> hello
tornado[  6,  0,  0]> hello
tornado[  1,  0,  0]> hello
tornado[  7,  0,  0]> hello
```

5. Run some micro-benchmarks

```
$ runBenchmarks.sh
```

The results will be available under ${TORNADO_ROOT}/var/results.

6. Explore the example code

Example code is located under ${TORNADO_ROOT}/share.