SPEC ACCEL™ OCL Result

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Supermicro
(Test Sponsor: HZDR)

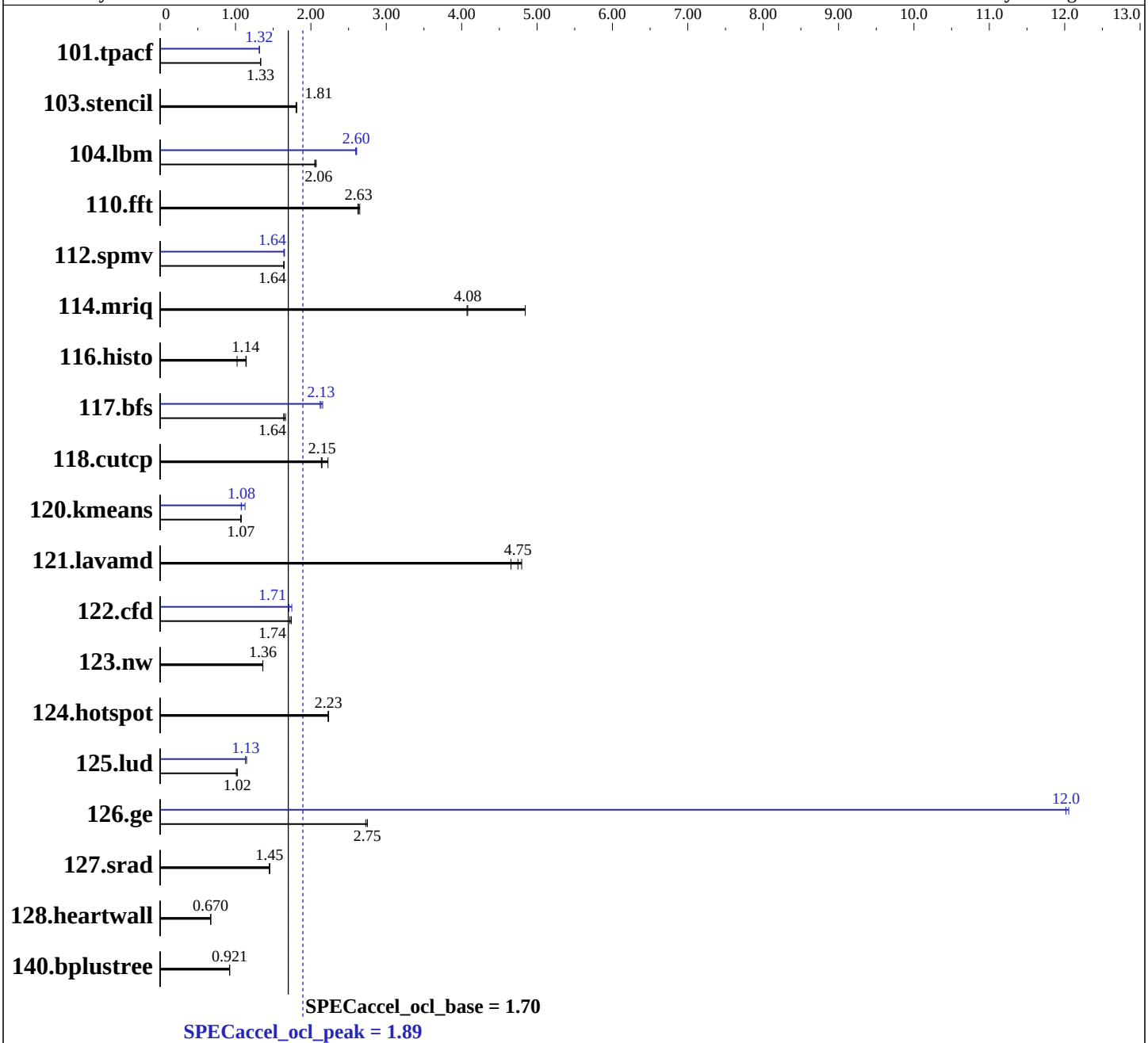
NVIDIA Tesla K20m
Supermicro X9DRG-HF

SPECaccel_ocl_peak = 1.89

SPECaccel_ocl_base = 1.70

ACCEL license: 65A
Test sponsor: HZDR
Tested by: HZDR

Test date: Aug-2017
Hardware Availability: Jan-2013
Software Availability: Aug-2016



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Hardware

CPU Name:	Intel Xeon E5-2609
CPU Characteristics:	No TURBO
CPU MHz:	2400
CPU MHz Maximum:	2400
FPU:	Integrated
CPU(s) enabled:	8 cores, 2 chips, 4 cores/chip
CPU(s) orderable:	1,2 chips
Primary Cache:	32 KB I + 32 KB D on chip per core
Secondary Cache:	256 KB I+D on chip per core
L3 Cache:	10 MB I+D on chip per chip
Other Cache:	None
Memory:	64 GB (8 x 8 GB 2Rx4 PC3-12800R-11, ECC, running at 1066MHz)
Disk Subsystem:	60 GB INTEL SSDSC2CW060A3
Other Hardware:	None

Accelerator

Accel Model Name:	Tesla K20m
Accel Vendor:	NVIDIA
Accel Name:	NVIDIA Tesla K20m
Type of Accel:	GPU
Accel Connection:	PCIe 2.0 16x
Does Accel Use ECC:	yes
Accel Description:	NVIDIA Tesla K20m, 2688 CUDA cores, 732 MHz 6 GB GDDR5 RAM (Kepler Generation)
Accel Driver:	NVIDIA UNIX x86_64 Kernel Module 367.48

Software

Operating System:	Ubuntu 14.04.5 LTS Ubuntu 14.04.5 LTS 4.4.0-38-generic
Compiler:	GNU Compiler C/C++ Version 6.2.0
File System:	ext3
System State:	Run level 5 (user-level)
Other Software:	NVIDIA Cuda SDK 7.0, driver version 367.48

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Results Table

Benchmark	Base						Peak					
	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio	Seconds	Ratio
101.tpacf	**80.3**	**1.33**	80.2	1.33	80.4	1.33	81.1	1.32	81.4	1.31	**81.3**	**1.32**
103.stencil	**69.1**	**1.81**	69.1	1.81	69.3	1.80	**69.1**	**1.81**	69.1	1.81	69.3	1.80
104.lbm	54.6	2.05	54.1	2.07	**54.4**	**2.06**	**43.1**	**2.60**	43.0	2.61	43.2	2.59
110.fft	**42.2**	**2.63**	41.9	2.65	42.3	2.62	**42.2**	**2.63**	41.9	2.65	42.3	2.62
112.spmv	89.6	1.64	**89.5**	**1.64**	89.5	1.64	89.5	1.64	**89.5**	**1.64**	89.1	1.65
114.mriq	**26.7**	**4.08**	22.5	4.84	26.8	4.07	**26.7**	**4.08**	22.5	4.84	26.8	4.07
116.histo	**100**	**1.14**	112	1.02	99.7	1.14	**100**	**1.14**	112	1.02	99.7	1.14
117.bfs	70.3	1.66	**71.3**	**1.64**	71.3	1.64	**54.8**	**2.13**	55.1	2.12	54.3	2.16
118.cutcp	**46.1**	**2.15**	46.3	2.14	44.5	2.23	**46.1**	**2.15**	46.3	2.14	44.5	2.23
120.kmeans	**93.1**	**1.07**	93.6	1.07	93.1	1.07	**92.7**	**1.08**	88.8	1.13	93.0	1.08
121.lavamd	22.7	4.80	23.4	4.65	**23.0**	**4.75**	22.7	4.80	23.4	4.65	**23.0**	**4.75**
122.cfd	**72.4**	**1.74**	73.2	1.72	72.4	1.74	72.2	1.75	73.8	1.71	**73.7**	**1.71**
123.nw	**84.4**	**1.36**	84.4	1.36	84.5	1.36	**84.4**	**1.36**	84.4	1.36	84.5	1.36
124.hotspot	51.2	2.23	51.0	2.24	**51.0**	**2.23**	51.2	2.23	51.0	2.24	**51.0**	**2.23**
125.lud	118	1.01	116	1.02	**116**	**1.02**	**105**	**1.13**	104	1.15	105	1.13
126.ge	56.8	2.73	56.4	2.75	**56.4**	**2.75**	12.9	12.0	12.9	12.1	**12.9**	**12.0**
127.srad	**78.6**	**1.45**	78.5	1.45	78.6	1.45	**78.6**	**1.45**	78.5	1.45	78.6	1.45
128.heartwall	158	0.670	**158**	**0.670**	158	0.671	158	0.670	**158**	**0.670**	158	0.671
140.bplustree	117	0.923	**117**	**0.921**	117	0.921	117	0.923	**117**	**0.921**	117	0.921

Results appear in the order in which they were run. Bold underlined text indicates a median measurement.

Platform Notes

```
Sysinfo program /tmp/spec/1.2/Docs/sysinfo
$Rev: 6965 $ $Date:: 2015-04-21 #$ c05a7f14b1b1765e3fe1df68447e8a35
running on kepler002 Thu Aug 24 13:13:30 2017

This section contains SUT (System Under Test) info as seen by
some common utilities.  To remove or add to this section, see:
  http://www.spec.org/accel/Docs/config.html#sysinfo

From /proc/cpuinfo
   model name : Intel(R) Xeon(R) CPU E5-2609 0 @ 2.40GHz
      2 "physical id"s (chips)
      8 "processors"
   cores, siblings (Caution: counting these is hw and system dependent.  The
   following excerpts from /proc/cpuinfo might not be reliable.  Use with
   caution.)
```

Continued on next page

Platform Notes (Continued)

```
        cpu cores : 4
        siblings  : 4
        physical 0: cores 0 1 2 3
        physical 1: cores 0 1 2 3
     cache size : 10240 KB

  From /proc/meminfo
     MemTotal:       65949360 kB
     HugePages_Total:       0
     Hugepagesize:       2048 kB

  /usr/bin/lsb_release -d
     Ubuntu 14.04.5 LTS

  From /etc/*release* /etc/*version*
     debian_version: jessie/sid
     os-release:
        NAME="Ubuntu"
        VERSION="14.04.5 LTS, Trusty Tahr"
        ID=ubuntu
        ID_LIKE=debian
        PRETTY_NAME="Ubuntu 14.04.5 LTS"
        VERSION_ID="14.04"
        HOME_URL="http://www.ubuntu.com/"
        SUPPORT_URL="http://help.ubuntu.com/"
     redhat-release: Red Hat Enterprise Linux Server release 6.5 (Santiago)
     rh-release: Red Hat Enterprise Linux Server release 7.2 (Maipo)

  uname -a:
     Linux kepler002 4.4.0-38-generic #57~14.04.1-Ubuntu SMP Tue Sep 6 17:20:43
     UTC 2016 x86_64 x86_64 x86_64 GNU/Linux

  run-level 5 Jan 23 15:07

  SPEC is set to: /tmp/spec/1.2
     Filesystem     Type  Size  Used Avail Use% Mounted on
     /dev/sda1      ext3   30G   14G   15G  47% /

  Cannot run dmidecode; consider saying 'chmod +s /usr/sbin/dmidecode'

  (End of data from sysinfo program)
```

Base Runtime Environment

C benchmarks:

```
    OpenCL Platform: NVIDIA CUDA, OpenCL 1.2 CUDA 8.0.44
    OpenCL Device #0: Tesla K20m, v 367.48
```

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Base Runtime Environment (Continued)

C++ benchmarks:
```
OpenCL Platform: NVIDIA CUDA, OpenCL 1.2 CUDA 8.0.44
OpenCL Device #0: Tesla K20m, v 367.48
```

Base Compiler Invocation

C benchmarks:
```
gcc
```

C++ benchmarks:
```
g++
```

Base Portability Flags

116.histo: `-DSPEC_LOCAL_MEMORY_HEADROOM=2`
122.cfd: `-std=gnu++98`

Base Optimization Flags

C benchmarks:
```
-O2 -I/opt/pkg/devel/cuda/7.0/include -L/opt/pkg/devel/cuda/7.0/libb64
-lOpenCL
```

C++ benchmarks:
```
-O2 -I/opt/pkg/devel/cuda/7.0/include -L/opt/pkg/devel/cuda/7.0/libb64
-lOpenCL
```

Peak Runtime Environment

C benchmarks:
```
OpenCL Platform: NVIDIA CUDA, OpenCL 1.2 CUDA 8.0.44
OpenCL Device #0: Tesla K20m, v 367.48
```

C++ benchmarks:
```
OpenCL Platform: NVIDIA CUDA, OpenCL 1.2 CUDA 8.0.44
OpenCL Device #0: Tesla K20m, v 367.48
```

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Peak Compiler Invocation

C benchmarks:
gcc

C++ benchmarks:
g++

Peak Portability Flags

116.histo: -DSPEC_LOCAL_MEMORY_HEADROOM=2
122.cfd: -std=gnu++98

Peak Optimization Flags

C benchmarks:

110.fft: basepeak = yes

114.mriq: basepeak = yes

116.histo: basepeak = yes

117.bfs: -O2 -DSPEC_ACCEL_WG_SIZE_0_0=64 -DSPEC_ACCEL_WG_SIZE_1_0=64
-I/opt/pkg/devel/cuda/7.0/include
-L/opt/pkg/devel/cuda/7.0/libb64 -lOpenCL

118.cutcp: basepeak = yes

121.lavamd: basepeak = yes

124.hotspot: basepeak = yes

127.srad: basepeak = yes

128.heartwall: basepeak = yes

140.bplustree: basepeak = yes

C++ benchmarks:

101.tpacf: -O2 -DSPEC_ACCEL_WG_SIZE_0_0=1024
-I/opt/pkg/devel/cuda/7.0/include
-L/opt/pkg/devel/cuda/7.0/libb64 -lOpenCL

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Peak Optimization Flags (Continued)

103.stencil: basepeak = yes

104.lbm: -O2 -DSPEC_ACCEL_WG_SIZE_0_0=32 -DSPEC_ACCEL_WG_SIZE_0_1=1
-DSPEC_ACCEL_WG_SIZE_0_2=1 -I/opt/pkg/devel/cuda/7.0/include
-L/opt/pkg/devel/cuda/7.0/libb64 -lOpenCL

112.spmv: -O2 -DSPEC_ACCEL_WG_SIZE_0_0=96
-I/opt/pkg/devel/cuda/7.0/include
-L/opt/pkg/devel/cuda/7.0/libb64 -lOpenCL

120.kmeans: -O2 -DSPEC_ACCEL_WG_SIZE_0_0=288
-I/opt/pkg/devel/cuda/7.0/include
-L/opt/pkg/devel/cuda/7.0/libb64 -lOpenCL

122.cfd: -O2 -DSPEC_ACCEL_WG_SIZE_3_0=288
-I/opt/pkg/devel/cuda/7.0/include
-L/opt/pkg/devel/cuda/7.0/libb64 -lOpenCL

123.nw: basepeak = yes

125.lud: -O2 -DSPEC_ACCEL_WG_SIZE_0_0=32
-I/opt/pkg/devel/cuda/7.0/include
-L/opt/pkg/devel/cuda/7.0/libb64 -lOpenCL

126.ge: -O2 -DSPEC_ACCEL_WG_SIZE_0_0=512 -DSPEC_ACCEL_WG_SIZE_1_0=1
-DSPEC_ACCEL_WG_SIZE_1_1=512
-I/opt/pkg/devel/cuda/7.0/include
-L/opt/pkg/devel/cuda/7.0/libb64 -lOpenCL

The flags file that was used to format this result can be browsed at
https://www.spec.org/accel/flags/flags-advanced.20170929.html

You can also download the XML flags source by saving the following link:
https://www.spec.org/accel/flags/flags-advanced.20170929.xml

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For questions about this result, please contact the tester.
For other inquiries, please contact webmaster@spec.org.

Tested with SPEC ACCEL v1.2.
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