

GeantV scalability on KNL

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GeantV scalability

Xeon: Intel Xeon E5-2683 v3 @2 GHz (14 cores - 28 threads)

KNL: Intel Xeon Phi 7210 @1.30 GHz (64 cores - 256 HW threads)

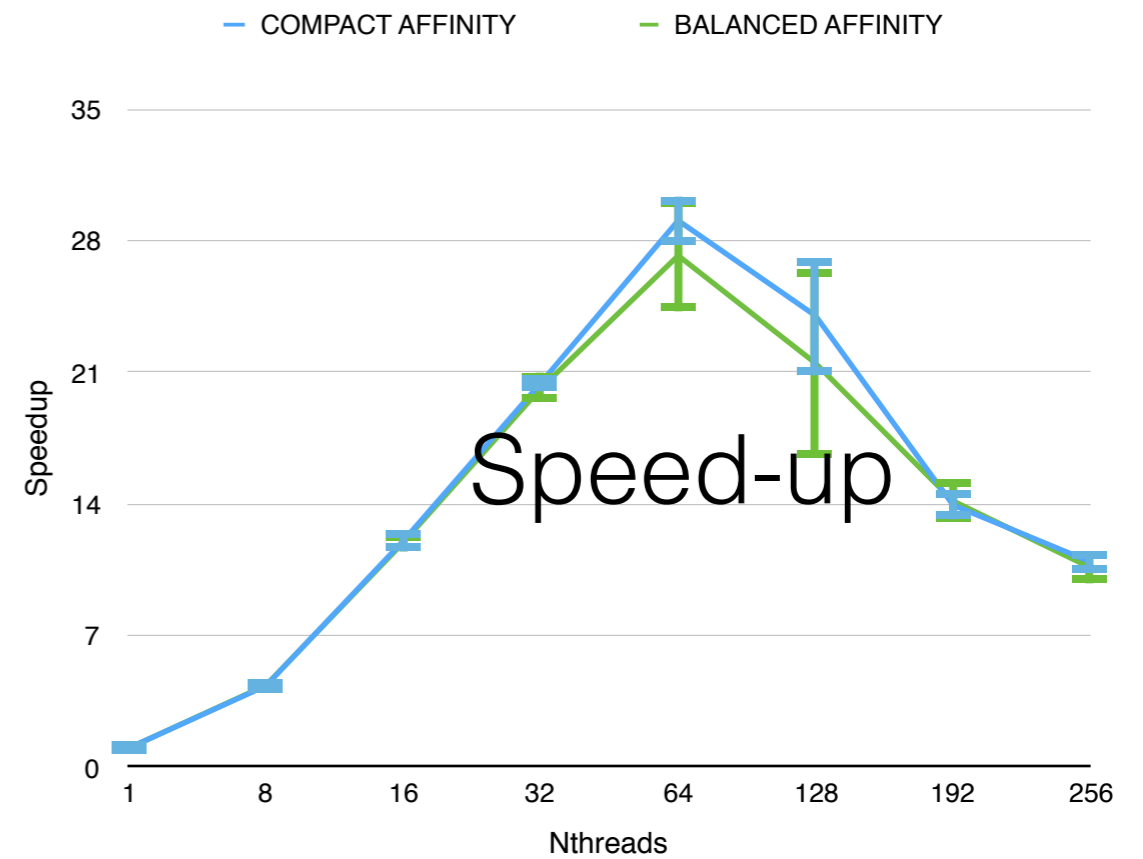
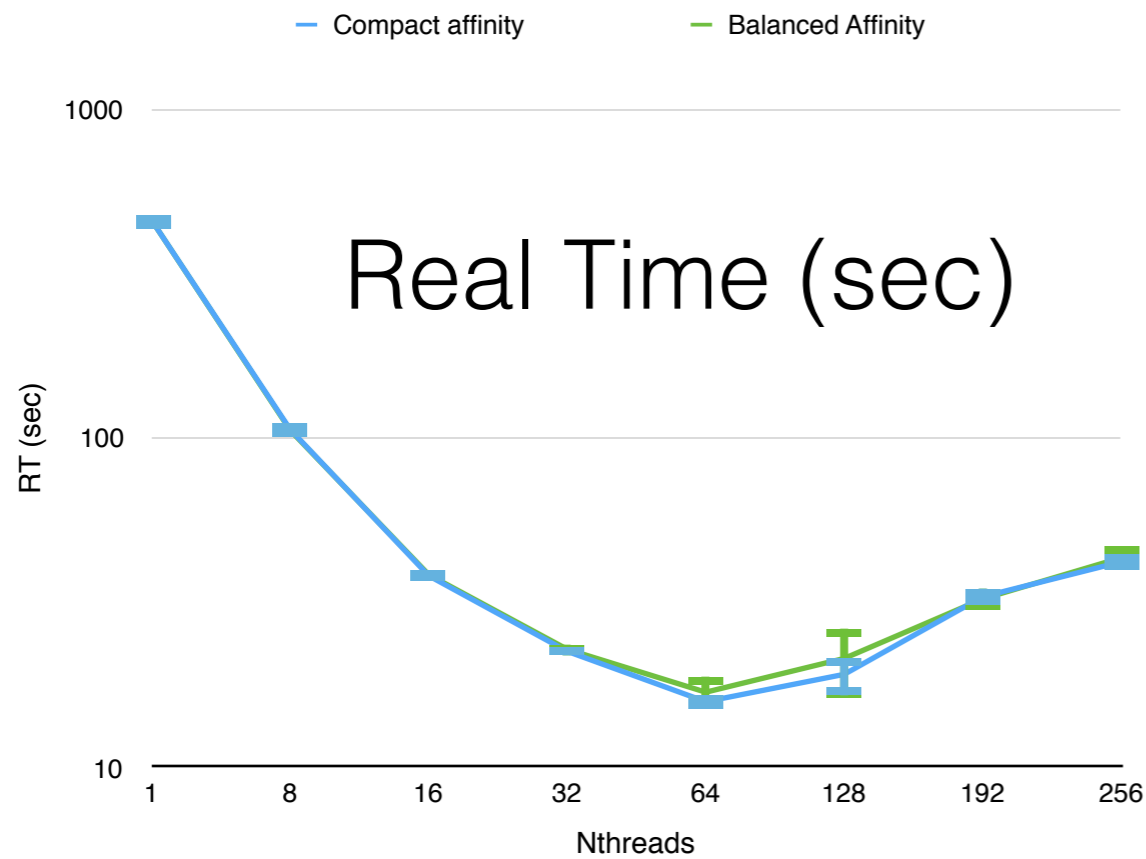
- numactl -H shows MCDRAM is booted in Flat Mode

```
svalleco@olninja021 GeantV $ numactl -H
available: 2 nodes (0-1)
node 0 cpus: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36
37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74
75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109
110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 1
38 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166
167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 1
95 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223
224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 2
52 253 254 255
node 0 size: 98207 MB
node 0 free: 57818 MB
node 1 cpus:
node 1 size: 16384 MB
node 1 free: 15888 MB
node distances:
node  0  1
  0:  10  31
  1:  31  10
```

- Ex03 geometry example:
./bin/runApp -e 50 -u 4 -t Nthreads
- UMESIMD backend and compile for AVX512 and AVX2

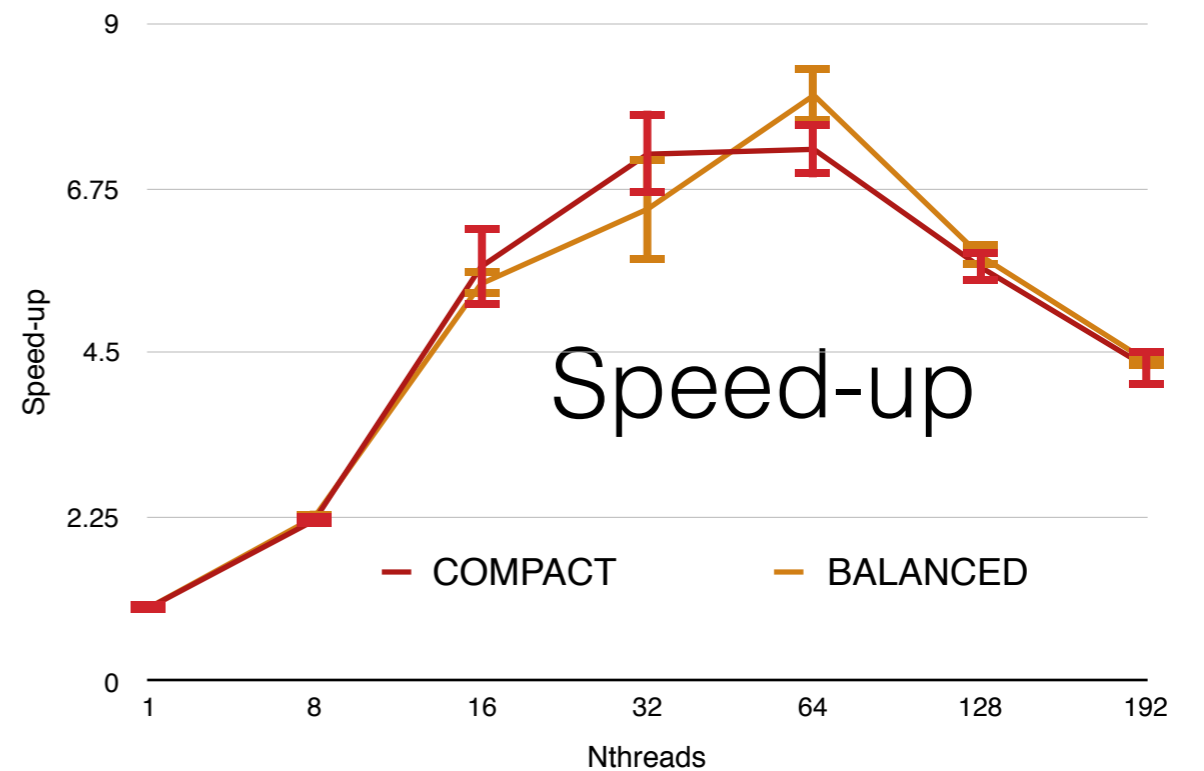
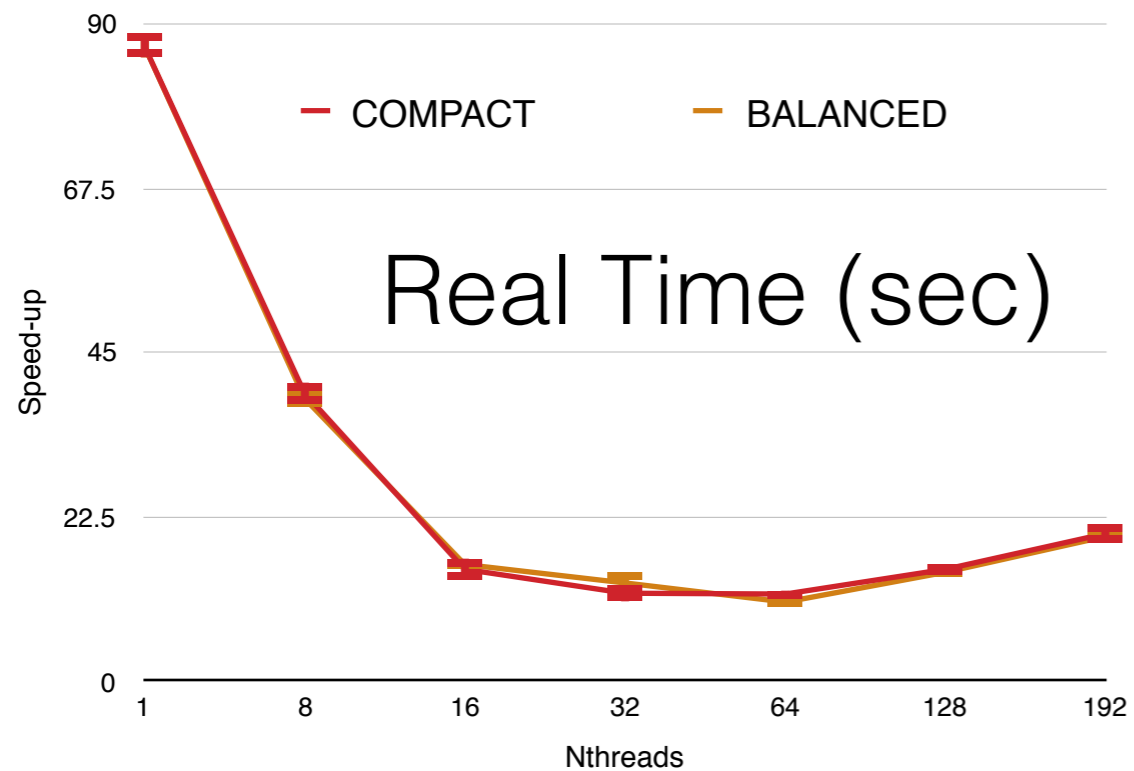
Scalability on KNL

Check thread affinity: compact vs balanced



Scalability on Xeon

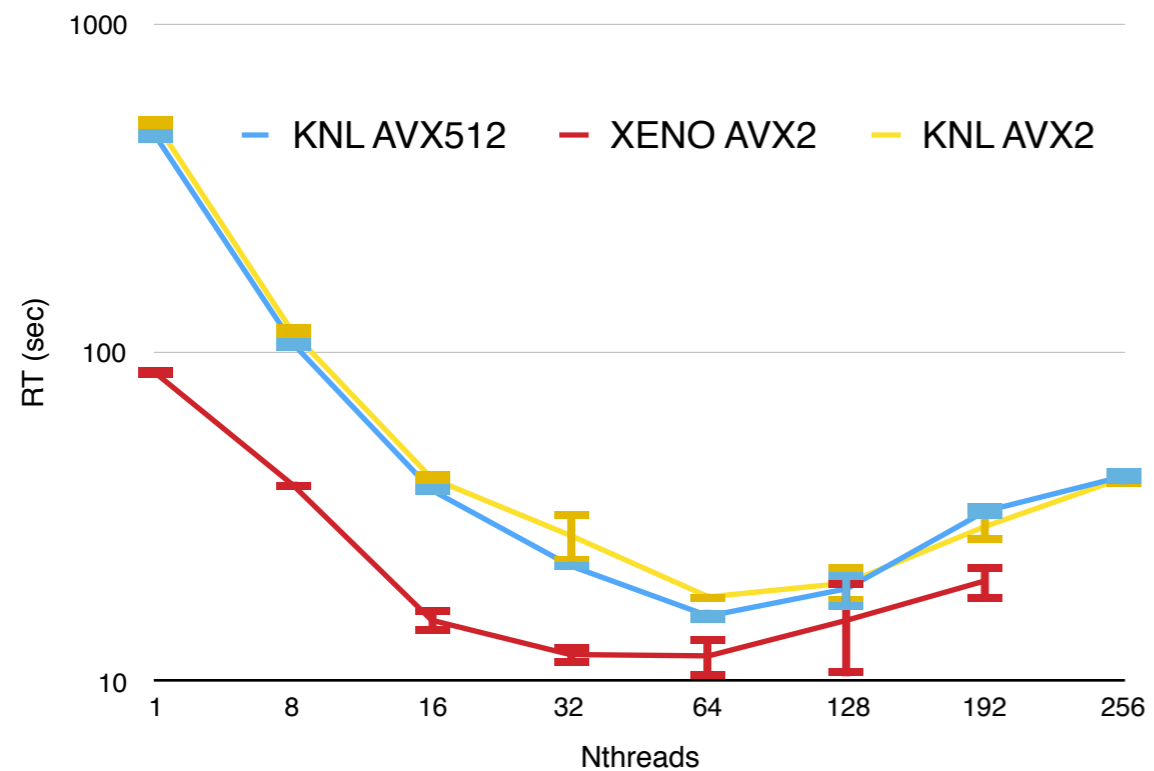
Check thread affinity: compact vs balanced



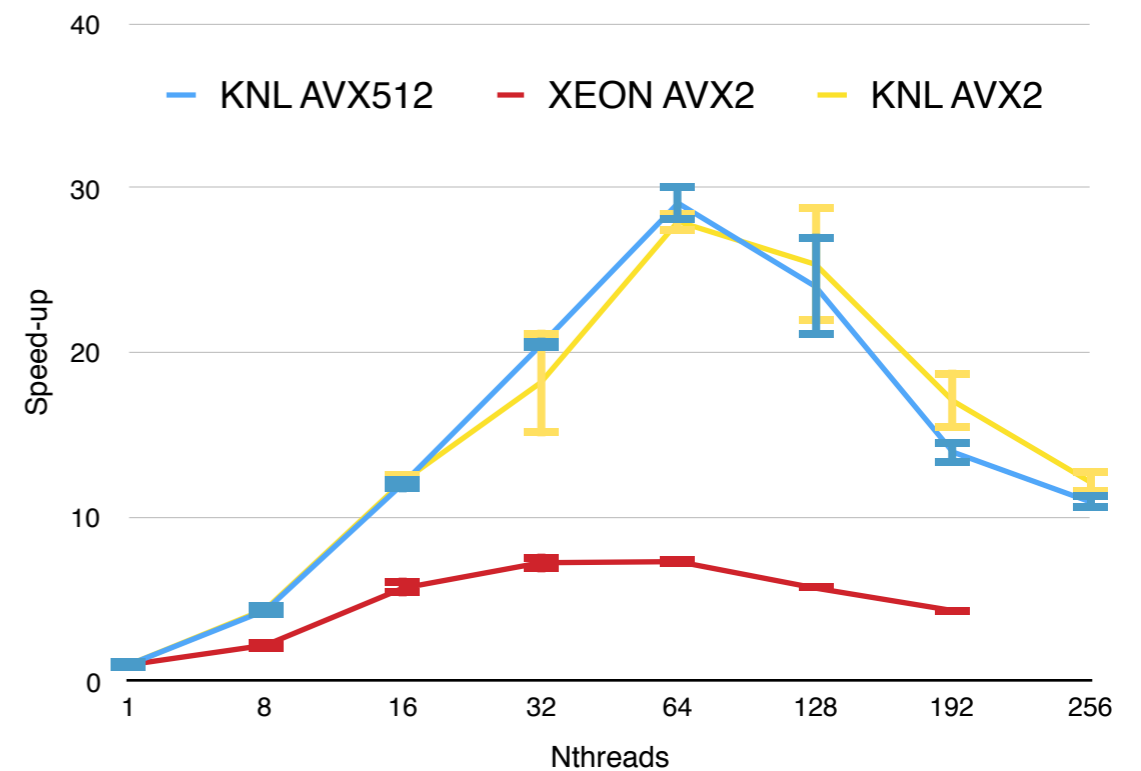
KNL vs Xeon

Check vectorization: compare also AVX512 and AVX2 on KNL

Real Time (sec)



Speed-up



Intel TBB vs static threads

On KNL: No significant difference in performance

