Calculating and Accounting for the Delay of Reading I2C buses

Each cycle consists of:

* 3 Reads of the I2C bus from the BMP180 Sensor
* One C File I/O, including a call to time()
* One call to usleep()

**Time Delays**

Time Delay When Performing One Cycle:

405.035 milliseconds

Time Delay When Performing N Cycles:

**Number of Cycles Per Second**

Theoretical Cycle Rate (Assuming No Delay in Reading I2C Sensors):

* N cycles per second
* Sleep for second between cycles

Experimental Cycle Rate (Including Delay listed above):

* N cycles per second
* Sleep for seconds between cycles
* delay(1) = 405.04
* Final Function:
  + (Assumes upper bound for standard deviation)
* When N is greater than 24, the delay between reading becomes greater than 1 second, meaning that the fastest possible sample rate is 24 cycles per second

**Code Examples**

int N = 15; // Performing 15 cycles per second

double sleepDuration = (1000000/N) – 405040; // converted milliseconds into microseconds

usleep(sleepDuration);