Quick I/O for Chapel

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The new I/O system is..
Easy
Fast
Parallel
Easy
// Read lines in a file
var f = open("test.txt", mode.r);
for (line, i) in (f.lines(), 1..) {
    write("Line ", i, " : ", line);
}

// Read 4-byte integers in a file
f = open("test.bin", mode.r);
var ch = f.reader(native);
var i:uint(32);
while ch.read(i) {
    writeln("Read: ", i);
}
Fast
Reading and Writing

times in seconds

1b write 1GiB
1b read 1GiB
UTF-8 write
UTF-8 read

C FILE*
Chapel QIO

UTF-8 test:
200x all Unicode codepoints
1M random reads in 1GiB

times in seconds

<table>
<thead>
<tr>
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<th>C FILE*</th>
<th>Chapel QIO</th>
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<tbody>
<tr>
<td>1b</td>
<td>2.30</td>
<td>0.58</td>
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<tr>
<td>2b</td>
<td>1.73</td>
<td>1.15</td>
</tr>
<tr>
<td>4b</td>
<td>0.58</td>
<td>1.15</td>
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<tr>
<td>8b</td>
<td>0.58</td>
<td>1.15</td>
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</table>
Parallel
f = open("test.bin", mode.r);

var offsets:[1..n] int = ...;

// Random 4-byte reads
forall pos in offsets {
    var ch = f.reader(native, start=4*pos, end=4*pos+4);

    var x:uint(32);
    ch.read(x);
    // do something with x
}
App

reader channel

writer channel

file

system calls

system calls

.a.read

App

.writer.write