BList Benchmarks

Comparing Various Structures and Systems

A comparison with `std::list` (Times are in seconds on maya)

Node size	std::list push_back 100,000,000	std::vector push_back 100,000,000	BList push_back 100,000,000	std::list insert 100,000	std::vector insert 100,000	BList insert 100,000
1	2.7	0.81	2.9	26.3	1.6	26.0
2			1.7			15.9
4			1.0			7.7
8			0.67			3.8
16			0.50			1.7
32			0.36			0.84
64			0.33			0.37
128			0.31			0.15
256			0.29			0.07
512			0.28			0.04

Inserting 1,000,000 elements (keeping the container sorted) into:

- `std::list` - 4 hours, 20 minutes
- `std::vector` - 166 s
- `std::set` - 9.1 s
- BList size 256 - 16 s
- BList size 512 - 6.9 s
- BList size 1024 - 3.3 s
- BList size 2048 - 2.10 s
- BList size 4096 - 2.15 s
- BList size 8192 - 3.6 s

Detailed computer specs.

```
struct BNode
{
  BNode *next;
  BNode *prev;
  int count; // number of items currently in the node
  T values[Size];
```

```
  BNode() : next(0), prev(0), count(0) {}
};
```

where T = **int** and there may be padding in the struct.

Inserting 100,000 items into a BList of various sizes: (*Asize* is the number of elements per node, *Nsize* is **sizeof**(*BNode*))

Maya (i7-3770@3.4GHz)	Olga (i7-930@2.8GHz)	Veronica (i7-3517UE@2.1GHz)	Volper (AMD FX-8120@3.1GHz)
Asize: 1 Nsize: 24 Items: 100000 Nodes: 100000 Average items per node: 1 Node utilization: 100% Elapsed time: 27.29 secs	Asize: 1 Nsize: 24 Items: 100000 Nodes: 100000 Average items per node: 1 Node utilization: 100% Elapsed time: 46.34 secs	Asize: 1 Nsize: 24 Items: 100000 Nodes: 100000 Average items per node: 1 Node utilization: 100% Elapsed time: 40.92 secs	Asize: 1 Nsize: 24 Items: 100000 Nodes: 100000 Average items per node: 1 Node utilization: 100% Elapsed time: 38.2 secs
==========	==========	==========	==========
Asize: 2 Nsize: 32 Items: 100000 Nodes: 61400 Average items per node: 1.629 Node utilization: 81.4% Elapsed time: 16.54 secs	Asize: 2 Nsize: 32 Items: 100000 Nodes: 61400 Average items per node: 1.629 Node utilization: 81.4% Elapsed time: 27.56 secs	Asize: 2 Nsize: 32 Items: 100000 Nodes: 61400 Average items per node: 1.629 Node utilization: 81.4% Elapsed time: 23.78 secs	Asize: 2 Nsize: 32 Items: 100000 Nodes: 61400 Average items per node: 1.629 Node utilization: 81.4% Elapsed time: 21.67 secs
==========	==========	==========	==========
Asize: 4 Nsize: 40 Items: 100000 Nodes: 33250 Average items per node: 3.008 Node utilization: 75.2% Elapsed time: 7.85 secs	Asize: 4 Nsize: 40 Items: 100000 Nodes: 33250 Average items per node: 3.008 Node utilization: 75.2% Elapsed time: 13.21 secs	Asize: 4 Nsize: 40 Items: 100000 Nodes: 33250 Average items per node: 3.008 Node utilization: 75.2% Elapsed time: 10.21 secs	Asize: 4 Nsize: 40 Items: 100000 Nodes: 33250 Average items per node: 3.008 Node utilization: 75.2% Elapsed time: 9.24 secs
==========	==========	==========	==========
Asize: 8 Nsize: 56 Items: 100000 Nodes: 17370 Average items per node: 5.757 Node utilization: 72% Elapsed time: 3.97 secs	Asize: 8 Nsize: 56 Items: 100000 Nodes: 17370 Average items per node: 5.757 Node utilization: 72% Elapsed time: 6.42 secs	Asize: 8 Nsize: 56 Items: 100000 Nodes: 17370 Average items per node: 5.757 Node utilization: 72% Elapsed time: 5.27 secs	Asize: 8 Nsize: 56 Items: 100000 Nodes: 17370 Average items per node: 5.757 Node utilization: 72% Elapsed time: 4.44 secs
==========	==========	==========	==========
Asize: 16 Nsize: 88 Items: 100000 Nodes: 8856 Average items per node: 11.29 Node utilization: 70.6% Elapsed time: 1.8 secs	Asize: 16 Nsize: 88 Items: 100000 Nodes: 8856 Average items per node: 11.29 Node utilization: 70.6% Elapsed time: 2.8 secs	Asize: 16 Nsize: 88 Items: 100000 Nodes: 8856 Average items per node: 11.29 Node utilization: 70.6% Elapsed time: 2.39 secs	Asize: 16 Nsize: 88 Items: 100000 Nodes: 8856 Average items per node: 11.29 Node utilization: 70.6% Elapsed time: 2.46 secs
==========	==========	==========	==========
Asize: 32 Nsize: 152 Items: 100000 Nodes: 4410	Asize: 32 Nsize: 152 Items: 100000 Nodes: 4410	Asize: 32 Nsize: 152 Items: 100000 Nodes: 4410	Asize: 32 Nsize: 152 Items: 100000 Nodes: 4410

```
Average items per node: 22.68
Node utilization: 70.9%

Elapsed time: 0.9 secs
==============================
Asize: 64
Nsize: 280
Items: 100000
Nodes: 2220
Average items per node: 45.05
Node utilization: 70.4%

Elapsed time: 0.38 secs
==============================
Asize: 128
Nsize: 536
Items: 100000
Nodes: 1085
Average items per node: 92.17
Node utilization: 72%

Elapsed time: 0.16 secs
==============================
Asize: 256
Nsize: 1048
Items: 100000
Nodes: 523
Average items per node: 191.2
Node utilization: 74.7%

Elapsed time: 0.07 secs
==============================
Asize: 512
Nsize: 2072
Items: 100000
Nodes: 257
Average items per node: 389.1
Node utilization: 76%

Elapsed time: 0.05 secs
==============================
Asize: 1024
Nsize: 4120
Items: 100000
Nodes: 128
Average items per node: 781.2
Node utilization: 76.3%

Elapsed time: 0.05 secs
==============================
Asize: 2048
Nsize: 8216
Items: 100000
Nodes: 64
Average items per node: 1562
Node utilization: 76.3%

Elapsed time: 0.08 secs
```

```
Average items per node: 22.68
Node utilization: 70.9%

Elapsed time: 1.41 secs
==============================
Asize: 64
Nsize: 280
Items: 100000
Nodes: 2220
Average items per node: 45.05
Node utilization: 70.4%

Elapsed time: 0.53 secs
==============================
Asize: 128
Nsize: 536
Items: 100000
Nodes: 1085
Average items per node: 92.17
Node utilization: 72%

Elapsed time: 0.19 secs
==============================
Asize: 256
Nsize: 1048
Items: 100000
Nodes: 523
Average items per node: 191.2
Node utilization: 74.7%

Elapsed time: 0.1 secs
==============================
Asize: 512
Nsize: 2072
Items: 100000
Nodes: 257
Average items per node: 389.1
Node utilization: 76%

Elapsed time: 0.06 secs
==============================
Asize: 1024
Nsize: 4120
Items: 100000
Nodes: 128
Average items per node: 781.2
Node utilization: 76.3%

Elapsed time: 0.08 secs
==============================
Asize: 2048
Nsize: 8216
Items: 100000
Nodes: 64
Average items per node: 1562
Node utilization: 76.3%

Elapsed time: 0.13 secs
```

```
Average items per node: 22.68
Node utilization: 70.9%

Elapsed time: 1.17 secs
==============================
Asize: 64
Nsize: 280
Items: 100000
Nodes: 2220
Average items per node: 45.05
Node utilization: 70.4%

Elapsed time: 0.5 secs
==============================
Asize: 128
Nsize: 536
Items: 100000
Nodes: 1085
Average items per node: 92.17
Node utilization: 72%

Elapsed time: 0.21 secs
==============================
Asize: 256
Nsize: 1048
Items: 100000
Nodes: 523
Average items per node: 191.2
Node utilization: 74.7%

Elapsed time: 0.09 secs
==============================
Asize: 512
Nsize: 2072
Items: 100000
Nodes: 257
Average items per node: 389.1
Node utilization: 76%

Elapsed time: 0.07 secs
==============================
Asize: 1024
Nsize: 4120
Items: 100000
Nodes: 128
Average items per node: 781.2
Node utilization: 76.3%

Elapsed time: 0.06 secs
==============================
Asize: 2048
Nsize: 8216
Items: 100000
Nodes: 64
Average items per node: 1562
Node utilization: 76.3%

Elapsed time: 0.12 secs
```

```
Average items per node: 22.68
Node utilization: 70.9%

Elapsed time: 1.22 secs
==============================
Asize: 64
Nsize: 280
Items: 100000
Nodes: 2220
Average items per node: 45.05
Node utilization: 70.4%

Elapsed time: 0.6 secs
==============================
Asize: 128
Nsize: 536
Items: 100000
Nodes: 1085
Average items per node: 92.17
Node utilization: 72%

Elapsed time: 0.3 secs
==============================
Asize: 256
Nsize: 1048
Items: 100000
Nodes: 523
Average items per node: 191.2
Node utilization: 74.7%

Elapsed time: 0.16 secs
==============================
Asize: 512
Nsize: 2072
Items: 100000
Nodes: 257
Average items per node: 389.1
Node utilization: 76%

Elapsed time: 0.1 secs
==============================
Asize: 1024
Nsize: 4120
Items: 100000
Nodes: 128
Average items per node: 781.2
Node utilization: 76.3%

Elapsed time: 0.1 secs
==============================
Asize: 2048
Nsize: 8216
Items: 100000
Nodes: 64
Average items per node: 1562
Node utilization: 76.3%

Elapsed time: 0.15 secs
```

```
==============================
Asize: 4096
Nsize: 16408
Items: 100000
Nodes: 32
Average items per node: 3125
Node utilization: 76.3%

Elapsed time: 0.16 secs
==============================
```

```
==============================
Asize: 4096
Nsize: 16408
Items: 100000
Nodes: 32
Average items per node: 3125
Node utilization: 76.3%

Elapsed time: 0.25 secs
==============================
```

```
==============================
Asize: 4096
Nsize: 16408
Items: 100000
Nodes: 32
Average items per node: 3125
Node utilization: 76.3%

Elapsed time: 0.23 secs
==============================
```

```
==============================
Asize: 4096
Nsize: 16408
Items: 100000
Nodes: 32
Average items per node: 3125
Node utilization: 76.3%

Elapsed time: 0.27 secs
==============================
```