

GPFS Performance Report

(Uses gpfsperf Command)

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0. Machine Informance

Node	8 nodes (1 server , 7 client provide disks)
CPU	Intel(R) Core(TM)2 Quad CPU Q6600 @ 2.40GHz (each node)
Memory	2GB DDR2 667 (each node)
Disk	320G+160G (each node) All nodes: WD 320G * 7 + 160G * 7 = 3.36T
NIC	Intel Corporation 82566DM Gigabit Network Connection
Switch	D-link 24 port GE switch

1. 8 Nodes, Replicate, Adjust Parameters

- **Context: Create 16G data (sequence)**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G -n
16g -r 1m
./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G
  recSize 1M nBytes 16G fileSize 16G
  nProcesses 1 nThreadsPerProcess 1
  file cache flushed before test
  not using data shipping
  not using direct I/O
  offsets accessed will cycle through the same file segment
  not using shared memory buffer
  not releasing byte-range token after open
  no fsync at end of test
  Data rate was 54649.55 Kbytes/sec, thread utilization 1.000
```

- **Context: Read 16G data (sequence)**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G -n
16g -r 1m
./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G
  recSize 1M nBytes 16G fileSize 16G
  nProcesses 1 nThreadsPerProcess 1
  file cache flushed before test
  not using data shipping
```

not using direct I/O
offsets accessed will cycle through the same file segment
not using shared memory buffer
not releasing byte-range token after open
Data rate was **83583.30 Kbytes/sec**, thread utilization 1.000

- **Context: Write 16G data (sequence)**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf write seq /home/gpfs_mount/gpfsperf_16G -n 16g -r 1m
./gpfsperf write seq /home/gpfs_mount/gpfsperf_16G
  recSize 1M nBytes 16G fileSize 16G
  nProcesses 1 nThreadsPerProcess 1
  file cache flushed before test
  not using data shipping
  not using direct I/O
  offsets accessed will cycle through the same file segment
  not using shared memory buffer
  not releasing byte-range token after open
  no fsync at end of test
  Data rate was 50898.76 Kbytes/sec, thread utilization 1.000
```

2. 8 Nodes, No Replicate, Adjust Parameters

- **Context: Create 16G data (sequence)**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G_2 -n 16g -r 1m
./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G_2
  recSize 1M nBytes 16G fileSize 16G
  nProcesses 1 nThreadsPerProcess 1
  file cache flushed before test
  not using data shipping
  not using direct I/O
  offsets accessed will cycle through the same file segment
  not using shared memory buffer
  not releasing byte-range token after open
  no fsync at end of test
  Data rate was 108330.24 Kbytes/sec, thread utilization 1.000
```

- **Context: Read 16G data (sequence)**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G_2 -n 16g -r 1m
./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G_2
  recSize 1M nBytes 16G fileSize 16G
```

nProcesses 1 nThreadsPerProcess 1
file cache flushed before test
not using data shipping
not using direct I/O
offsets accessed will cycle through the same file segment
not using shared memory buffer
not releasing byte-range token after open
Data rate was **82420.96 Kbytes/sec**, thread utilization 1.000

- **Context: Write 16G data (sequence)**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf write seq /home/gpfs_mount/gpfsperf_16G_2 -n 16g -r 1m  
./gpfsperf write seq /home/gpfs_mount/gpfsperf_16G_2  
recSize 1M nBytes 16G fileSize 16G  
nProcesses 1 nThreadsPerProcess 1  
file cache flushed before test  
not using data shipping  
not using direct I/O  
offsets accessed will cycle through the same file segment  
not using shared memory buffer  
not releasing byte-range token after open  
no fsync at end of test  
Data rate was 108820.45 Kbytes/sec, thread utilization 1.000
```

3. Multi-thread

3.1 Create Operation

- **Context: Create 16G data, 1 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G_3 -n 16g -r 1m -th 1  
./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G_3  
recSize 1M nBytes 16G fileSize 16G  
nProcesses 1 nThreadsPerProcess 1  
file cache flushed before test  
not using data shipping  
not using direct I/O  
offsets accessed will cycle through the same file segment  
not using shared memory buffer  
not releasing byte-range token after open  
no fsync at end of test  
Data rate was 50800.95 Kbytes/sec, thread utilization 1.000
```

- **Context: Create 16G data, 2 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G_3
-n 16g -r 1m -th 2
./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G_3
recSize 1M nBytes 16G fileSize 16G
nProcesses 1 nThreadsPerProcess 2
file cache flushed before test
not using data shipping
not using direct I/O
offsets accessed will cycle through the same file segment
not using shared memory buffer
not releasing byte-range token after open
no fsync at end of test
Data rate was 50297.13 Kbytes/sec, thread utilization 0.999
```

- **Context: Create 16G data, 4 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G_3
-n 16g -r 1m -th 4
./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G_3
recSize 1M nBytes 16G fileSize 16G
nProcesses 1 nThreadsPerProcess 4
file cache flushed before test
not using data shipping
not using direct I/O
offsets accessed will cycle through the same file segment
not using shared memory buffer
not releasing byte-range token after open
no fsync at end of test
Data rate was 50848.45 Kbytes/sec, thread utilization 0.998
```

- **Context: Create 16G data, 8 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G_3
-n 16g -r 1m -th 8
./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G_3
recSize 1M nBytes 16G fileSize 16G
nProcesses 1 nThreadsPerProcess 8
file cache flushed before test
not using data shipping
not using direct I/O
offsets accessed will cycle through the same file segment
not using shared memory buffer
not releasing byte-range token after open
no fsync at end of test
Data rate was 50469.88 Kbytes/sec, thread utilization 0.963
```

- **Context: Create 16G data, 16 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G_3
-n 16g -r 1m -th 16
./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G_3
  recSize 1M nBytes 16G fileSize 16G
  nProcesses 1 nThreadsPerProcess 16
  file cache flushed before test
  not using data shipping
  not using direct I/O
  offsets accessed will cycle through the same file segment
  not using shared memory buffer
  not releasing byte-range token after open
  no fsync at end of test
  Data rate was 52578.33 Kbytes/sec, thread utilization 0.919
```

- **Context: Create 16G data, 32 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G_3
-n 16g -r 1m -th 32
./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G_3
  recSize 1M nBytes 16G fileSize 16G
  nProcesses 1 nThreadsPerProcess 32
  file cache flushed before test
  not using data shipping
  not using direct I/O
  offsets accessed will cycle through the same file segment
  not using shared memory buffer
  not releasing byte-range token after open
  no fsync at end of test
  Data rate was 53107.28 Kbytes/sec, thread utilization 0.966
```

- **Context: Create 16G data, 64 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G_3
-n 16g -r 1m -th 64
./gpfsperf create seq /home/gpfs_mount/gpfsperf_16G_3
  recSize 1M nBytes 16G fileSize 16G
  nProcesses 1 nThreadsPerProcess 64
  file cache flushed before test
  not using data shipping
  not using direct I/O
  offsets accessed will cycle through the same file segment
  not using shared memory buffer
  not releasing byte-range token after open
  no fsync at end of test
  Data rate was 53019.53 Kbytes/sec, thread utilization 0.978
```

3.2 Read Operation

- **Context: Read 16G data, 1 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G_3 -r
1m -n 16g -th 1
./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G_3
  recSize 1M nBytes 16G fileSize 16G
  nProcesses 1 nThreadsPerProcess 1
  file cache flushed before test
  not using data shipping
  not using direct I/O
  offsets accessed will cycle through the same file segment
  not using shared memory buffer
  not releasing byte-range token after open
  Data rate was 81685.18 Kbytes/sec, thread utilization 1.000
```

- **Context: Read 16G data, 2 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G_3 -r
1m -n 16g -th 2
./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G_3
  recSize 1M nBytes 16G fileSize 16G
  nProcesses 1 nThreadsPerProcess 2
  file cache flushed before test
  not using data shipping
  not using direct I/O
  offsets accessed will cycle through the same file segment
  not using shared memory buffer
  not releasing byte-range token after open
  Data rate was 90844.61 Kbytes/sec, thread utilization 0.999
```

- **Context: Read 16G data, 4 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G_3 -r
1m -n 16g -th 4
./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G_3
  recSize 1M nBytes 16G fileSize 16G
  nProcesses 1 nThreadsPerProcess 4
  file cache flushed before test
  not using data shipping
  not using direct I/O
  offsets accessed will cycle through the same file segment
  not using shared memory buffer
  not releasing byte-range token after open
  Data rate was 89538.89 Kbytes/sec, thread utilization 0.997
```

- **Context: Read 16G data, 8 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G_3 -r
1m -n 16g -th 8
./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G_3
  recSize 1M nBytes 16G fileSize 16G
  nProcesses 1 nThreadsPerProcess 8
  file cache flushed before test
  not using data shipping
  not using direct I/O
  offsets accessed will cycle through the same file segment
  not using shared memory buffer
  not releasing byte-range token after open
  Data rate was 87044.97 Kbytes/sec, thread utilization 0.994
```

- **Context: Read 16G data, 16 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G_3 -r
1m -n 16g -th 16
./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G_3
  recSize 1M nBytes 16G fileSize 16G
  nProcesses 1 nThreadsPerProcess 16
  file cache flushed before test
  not using data shipping
  not using direct I/O
  offsets accessed will cycle through the same file segment
  not using shared memory buffer
  not releasing byte-range token after open
  Data rate was 94899.75 Kbytes/sec, thread utilization 0.990
```

- **Context: Read 16G data, 32 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G_3 -r
1m -n 16g -th 32
./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G_3
  recSize 1M nBytes 16G fileSize 16G
  nProcesses 1 nThreadsPerProcess 32
  file cache flushed before test
  not using data shipping
  not using direct I/O
  offsets accessed will cycle through the same file segment
  not using shared memory buffer
  not releasing byte-range token after open
  Data rate was 90657.18 Kbytes/sec, thread utilization 0.983
```

- **Context: Read 16G data, 64 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G_3 -r
1m -n 16g -th 64
./gpfsperf read seq /home/gpfs_mount/gpfsperf_16G_3
```

recSize 1M nBytes 16G fileSize 16G
nProcesses 1 nThreadsPerProcess 64
file cache flushed before test
not using data shipping
not using direct I/O
offsets accessed will cycle through the same file segment
not using shared memory buffer
not releasing byte-range token after open
Data rate was **89751.67 Kbytes/sec**, thread utilization 0.983

3.3 Write Operation

- **Context: Write 16G data, 1 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf write seq /home/gpfs_mount/gpfsperf_16G_3 -
r 1m -n 16g -th 1
./gpfsperf write seq /home/gpfs_mount/gpfsperf_16G_3
recSize 1M nBytes 16G fileSize 16G
nProcesses 1 nThreadsPerProcess 1
file cache flushed before test
not using data shipping
not using direct I/O
offsets accessed will cycle through the same file segment
not using shared memory buffer
not releasing byte-range token after open
no fsync at end of test
Data rate was 50819.17 Kbytes/sec, thread utilization 1.000
```

- **Context: Write 16G data, 2 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf write seq /home/gpfs_mount/gpfsperf_16G_3 -
r 1m -n 16g -th 2
./gpfsperf write seq /home/gpfs_mount/gpfsperf_16G_3
recSize 1M nBytes 16G fileSize 16G
nProcesses 1 nThreadsPerProcess 2
file cache flushed before test
not using data shipping
not using direct I/O
offsets accessed will cycle through the same file segment
not using shared memory buffer
not releasing byte-range token after open
no fsync at end of test
Data rate was 50588.81 Kbytes/sec, thread utilization 1.000
```

- **Context: Write 16G data, 4 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf write seq /home/gpfs_mount/gpfsperf_16G_3 -
r 1m -n 16g -th 4
./gpfsperf write seq /home/gpfs_mount/gpfsperf_16G_3
recSize 1M nBytes 16G fileSize 16G
nProcesses 1 nThreadsPerProcess 4
file cache flushed before test
not using data shipping
not using direct I/O
offsets accessed will cycle through the same file segment
not using shared memory buffer
not releasing byte-range token after open
no fsync at end of test
Data rate was 50694.87 Kbytes/sec, thread utilization 0.999
```

- **Context: Write 16G data, 8 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf write seq /home/gpfs_mount/gpfsperf_16G_3 -
r 1m -n 16g -th 8
./gpfsperf write seq /home/gpfs_mount/gpfsperf_16G_3
recSize 1M nBytes 16G fileSize 16G
nProcesses 1 nThreadsPerProcess 8
file cache flushed before test
not using data shipping
not using direct I/O
offsets accessed will cycle through the same file segment
not using shared memory buffer
not releasing byte-range token after open
no fsync at end of test
Data rate was 51648.90 Kbytes/sec, thread utilization 0.985
```

- **Context: Write 16G data, 16 thread**

```
gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsperf write seq /home/gpfs_mount/gpfsperf_16G_3 -
r 1m -n 16g -th 16
./gpfsperf write seq /home/gpfs_mount/gpfsperf_16G_3
recSize 1M nBytes 16G fileSize 16G
nProcesses 1 nThreadsPerProcess 16
file cache flushed before test
not using data shipping
not using direct I/O
offsets accessed will cycle through the same file segment
not using shared memory buffer
not releasing byte-range token after open
no fsync at end of test
Data rate was 53019.51 Kbytes/sec, thread utilization 0.924
```

- **Context: Write 16G data, 32 thread**

```

gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsp perf write seq /home/gpfs_mount/gpfsperf_16G_3 -
r 1m -n 16g -th 32
./gpfsp perf write seq /home/gpfs_mount/gpfsperf_16G_3
  recSize 1M nBytes 16G fileSize 16G
  nProcesses 1 nThreadsPerProcess 32
  file cache flushed before test
  not using data shipping
  not using direct I/O
  offsets accessed will cycle through the same file segment
  not using shared memory buffer
  not releasing byte-range token after open
  no fsync at end of test
  Data rate was 53003.69 Kbytes/sec, thread utilization 0.966

```

- **Context: Write 16G data, 64 thread**

```

gpfs-server:/usr/lpp/mmfs/samples/perf# ./gpfsp perf write seq /home/gpfs_mount/gpfsperf_16G_3 -
r 1m -n 16g -th 64
./gpfsp perf write seq /home/gpfs_mount/gpfsperf_16G_3
  recSize 1M nBytes 16G fileSize 16G
  nProcesses 1 nThreadsPerProcess 64
  file cache flushed before test
  not using data shipping
  not using direct I/O
  offsets accessed will cycle through the same file segment
  not using shared memory buffer
  not releasing byte-range token after open
  no fsync at end of test
  Data rate was 53590.98 Kbytes/sec, thread utilization 0.971

```

4. Compare

- **All kind Operation (sequence)**

	Replicate & Adjust Parameters	No Replicate & Adjust Parameters
Create	54649.55 KB/s	108330.24 KB/s
Read	83583.30 KB/s	82420.96 KB/s
Write	50898.76 KB/s	108820.45 KB/s

- Multi-thread (sequence)

	1	2	4	8	16	32	64
Create	50800.95 KB/s	50297.13 KB/s	50848.45 KB/s	50469.88 KB/s	52578.33 KB/s	53107.28 KB/s	53019.53 KB/s
Read	81685.18 KB/s	90844.61 KB/s	89538.89 KB/s	87044.97 KB/s	94899.75 KB/s	90657.18 KB/s	89751.67 KB/s
Write	50819.17 KB/s	50588.81 KB/s	50694.87 KB/s	51648.90 KB/s	53019.51 KB/s	53003.69 KB/s	53590.98 KB/s