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12- 5.)  $10,000 \text{ requests} * 200\mu\text{s} = 2,000,000\mu\text{s} = 2\text{sec}$  time to fulfill the requests with no concurrency, performance is limited by read latency.

12-6.) With concurrency we are limited by sustained read IOPs of 100,000 per second,  $10,000 / 100,000$  is 0.1 seconds or we are limited by the sustained bandwidth of 2,048,000,000 per second,  $(10,000 * 4,000 = 40,000,000) = 40,000,000 / 2,048,000,000 = 0.02$  seconds.

13-5A.) The largest file that can be accessed by a direct pointers is 72KB's.

13-5B.)

1 indirectBlock=  $2^{10} \times 6\text{kb}$

1 doubleindirect =  $2^{10} \times 2^{10} \times 6\text{kb}$

1 thripleidirect =  $2^{10} \times 2^{10} \times 2^{10} \times 6\text{kb}$

1 quadra=  $2^{10} \times 2^{10} \times 2^{10} \times 2^{10} \times 6\text{kb}$   
=6,156 TB