

공개 S/W 기술지원 KISTI

한국소프트웨어진흥원
공개SW기술지원센터

<Revision 정보>

일자	VERSION	변경내역	작성자
2007. 8. 28	0.1	초기 작성	손명선

 HTTP://WWW.OSS.OR.KR	공개SW 기술지원	
	구분 : 기술지원	단계:
	작성자: 손명선	작성일: 2007.8. 28
	검토자:	검토일:
	승인자:	승인일:

1. 대상기업/기관 정보

구분	항목	내용	비고
기업/기관 정보	지역	대전시 유성구 과학로 335 한국과학기술정보연구원	
	기업/기관 명칭	한국과학기술정보연구원	
	부서	클러스터개발팀	
	직책	팀장	
	담당자 이름	김성호	
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2. 대상기업/기관 지원사항

구분	항목	내용	비고
기업/기관 지원사항	접수내용	Glory 테스트 베드 시스템 제안용 계산노드 벤치마크 지원	
	지원내역	1. 벤치마크 테스트 프로그램 및 내용 ○ ab : Apache 서버의 전송 속도 측정 ○ httpperf : Apache 서버의 응답 속도 측정 ○ stream : 단일 노드의 memory 대역폭 측정 ○ iiozone : 단일 노드의 파일 I/O 성능 측정 2. 벤치마크 준비 ○ 측정서버와 벤치마크용 서버에는 부요 리눅스 2.0 OS Full 버전을 설치 ○ 성능측정서버와 벤치마크용 서버 같은 IP대역으로 설정 ○ 벤치마크용 서버에서 httpd 데몬을 활성화 시키고 방화벽을 중지시켜 측정서버의 성능측정을 위한 액세스를 허용	

		○ 벤치마크용 서버의 HTTP 성능조절 값은 기본 값을 변경하지 않고 그대로 사용함. 성능조절 기본 값은 아래와 같음. ▶ 최대접속횟수 : 150 ▶ 연결대기시간 : 300 ▶ 연 결당 최대 요청횟수 : 100 ▶ 다음접속을 위한 대기시간 : 15 ○ 측정서버에 Httpperf 프로그램을 다운 받아 설치. 벤치마크용 서버에는 stream, iozone 프로그램을 다운 받아 설치. 즉 Ab, Httpperf는 측정서버에서 성능측정이 이루어지며, stream, iozone은 벤치마크용 서버에서 로컬로 성능측정이 이루어짐 3. ab 벤치마크 수행 <pre>[root@host01 ~]# ab -c 1000 -n 1000 -t 10 http://123.215.230.161/ This is ApacheBench, Version 2.0.41-dev <\$Revision: 1.141 \$> apache-2.0 Copyright (c) 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/ Copyright (c) 1998-2002 The Apache Software Foundation, http://www.apache.org/ Benchmarking 123.215.230.161 (be patient) Completed 5000 requests Completed 10000 requests Completed 15000 requests Finished 19804 requests Server Software: Apache/2.0.52 Server Hostname: 123.215.230.161 Server Port: 80 Document Path: / Document Length: 3985 bytes</pre>	
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		Concurrency Level: 1000 Time taken for tests: 10.993 seconds Complete requests: 19804 Failed requests: 0 Write errors: 0 Non-2xx responses: 19806 Total transferred: 82868304 bytes HTML transferred: 78926910 bytes Requests per second: 1980.20 [#/sec] (mean) Time per request: 504.999 [ms] (mean) Time per request: 0.505 [ms] (mean, across all concurrent requests) Transfer rate: 8091.80 [Kbytes/sec] received Connection Times (ms) <table><thead><tr><th></th><th>min</th><th>mean[+/-sd]</th><th>median</th><th>max</th></tr></thead><tbody><tr><td>Connect:</td><td>1</td><td>83 596.7</td><td>1</td><td>9005</td></tr><tr><td>Processing:</td><td>11</td><td>96 335.5</td><td>60</td><td>6299</td></tr><tr><td>Waiting:</td><td>10</td><td>93 335.6</td><td>58</td><td>6296</td></tr><tr><td>Total:</td><td>45</td><td>179 783.3</td><td>62</td><td>9522</td></tr></tbody></table> Percentage of the requests served within a certain time (ms) <table><tbody><tr><td>50%</td><td>62</td></tr><tr><td>66%</td><td>70</td></tr><tr><td>75%</td><td>76</td></tr><tr><td>80%</td><td>78</td></tr><tr><td>90%</td><td>95</td></tr><tr><td>95%</td><td>111</td></tr><tr><td>98%</td><td>3059</td></tr><tr><td>99%</td><td>3663</td></tr><tr><td>100%</td><td>9522 (longest request)</td></tr></tbody></table>		min	mean[+/-sd]	median	max	Connect:	1	83 596.7	1	9005	Processing:	11	96 335.5	60	6299	Waiting:	10	93 335.6	58	6296	Total:	45	179 783.3	62	9522	50%	62	66%	70	75%	76	80%	78	90%	95	95%	111	98%	3059	99%	3663	100%	9522 (longest request)	
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4. httpperf 벤치마크 수행

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[root@host01 ~]# httpperf --server 123.215.230.161
--rate 1000 --num-conns 20000 --hog
httpperf --hog --client=0/1 --server=123.215.230.161
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		<pre> --port=80 --uri=/ --rate=1000 --send-buffer=4096 --recv-buffer=16384 --num-conns=20000 --num-calls=1 Maximum connect burst length: 1 Total: connections 20000 requests 20000 replies 20000 test-duration 19.999 s Connection rate: 1000.0 conn/s (1.0 ms/conn, <=26 concurrent connections) Connection time [ms]: min 0.8 avg 1.4 max 25.1 median 0.5 stddev 2.4 Connection time [ms]: connect 0.3 Connection length [replies/conn]: 1.000 Request rate: 1000.0 req/s (1.0 ms/req) Request size [B]: 67.0 Reply rate [replies/s]: min 999.9 avg 1000.0 max 1000.3 stddev 0.2 (3 samples) Reply time [ms]: response 1.0 transfer 0.0 Reply size [B]: header 199.0 content 3985.0 footer 0.0 (total 4184.0) Reply status: 1xx=0 2xx=0 3xx=0 4xx=20000 5xx=0 CPU time [s]: user 2.11 system 17.89 (user 10.5% system 89.5% total 100.0%) Net I/O: 4151.6 KB/s (34.0*10^6 bps) Errors: total 0 client-timo 0 socket-timo 0 connrefused 0 connreset 0 Errors: fd-unavail 0 addrunavail 0 ftab-full 0 other 0 </pre>	
		5. stream 벤치마크 수행 <pre> [root@host02 bench]# ./stream ----- STREAM version \$Revision: 5.8 \$ </pre>	

		<pre> ----- This system uses 8 bytes per DOUBLE PRECISION word. ----- Array size = 2000000, Offset = 0 Total memory required = 45.8 MB. Each test is run 10 times, but only the *best* time for each is used. ----- Printing one line per active thread.... ----- Your clock granularity/precision appears to be 5 microseconds. Each test below will take on the order of 17198 microseconds. (= 3439 clock ticks) Increase the size of the arrays if this shows that you are not getting at least 20 clock ticks per test. ----- WARNING -- The above is only a rough guideline. For best results, please be sure you know the precision of your system timer. ----- Function Rate (MB/s) Avg time Min time Max time Copy: 1373.8586 0.0234 0.0233 0.0234 Scale: 1376.1729 0.0233 0.0233 0.0234 Add: 1698.0915 0.0284 0.0283 0.0286 Triad: 1703.5836 0.0283 0.0282 0.0290 ----- Solution Validates ----- </pre>	
		6. iozone 벤치마크 수행 <pre> [root@host02 bin]# ./iozone -s 2g -r 4k -peo -t 2 </pre>	

		<pre> iozone: Performance Test of File I/O Version \$Revision: 3.283 \$ Compiled for 32 bit mode. Build: linux Contributors:William Norcott, Don Capps, Isom Crawford, Kirby Collins Al Slater, Scott Rhine, Mike Wisner, Ken Goss Steve Landherr, Brad Smith, Mark Kelly, Dr. Alain CYR, Randy Dunlap, Mark Montague, Dan Million, Jean-Marc Zucconi, Jeff Blomberg, Benny Halevy, Erik Habbinga, Kris Strecker, Walter Wong. Run began: Fri Aug 24 14:25:40 2007 File size set to 2097152 KB Record Size 4 KB Purge Mode On Include fsync in write timing SYNC Mode. Command line used: ./iozone -s 2g -r 4k -peo -t 2 Output is in Kbytes/sec Time Resolution = 0.000003 seconds. Processor cache size set to 1024 Kbytes. Processor cache line size set to 32 bytes. File stride size set to 17 * record size. Throughput test with 2 processes Each process writes a 2097152 Kbyte file in 4 Kbyte records Children see throughput for 2 initial writers = 369.74 KB/sec </pre>	
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		Parent sees throughput for 2 initial writers = 369.73 KB/sec Min throughput per process = 184.87 KB/sec Max throughput per process = 184.87 KB/sec Avg throughput per process = 184.87 KB/sec Min xfer = 2097144.00 KB Children see throughput for 2 rewriters = 10549.27 KB/sec Parent sees throughput for 2 rewriters = 10548.93 KB/sec Min throughput per process = 5238.08 KB/sec Max throughput per process = 5311.19 KB/sec Avg throughput per process = 5274.63 KB/sec Min xfer = 2068400.00 KB Children see throughput for 2 readers = 19369.47 KB/sec Parent sees throughput for 2 readers = 19368.78 KB/sec Min throughput per process = 9663.02 KB/sec Max throughput per process = 9706.45 KB/sec Avg throughput per process = 9684.73 KB/sec Min xfer = 2087912.00 KB Children see throughput for 2 re-readers	
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		<pre> = 19626.49 KB/sec Parent sees throughput for 2 re-readers = 19624.24 KB/sec Min throughput per process = 9807.07 KB/sec Max throughput per process = 9819.42 KB/sec Avg throughput per process = 9813.25 KB/sec Min xfer = 2094824.00 KB Children see throughput for 2 reverse readers = 2167.88 KB/sec Parent sees throughput for 2 reverse readers = 2167.87 KB/sec Min throughput per process = 1081.47 KB/sec Max throughput per process = 1086.41 KB/sec Avg throughput per process = 1083.94 KB/sec Min xfer = 2087648.00 KB Children see throughput for 2 stride readers = 2250.42 KB/sec Parent sees throughput for 2 stride readers = 2250.40 KB/sec Min throughput per process = 1118.17 KB/sec Max throughput per process = 1132.26 KB/sec Avg throughput per process = 1125.21 KB/sec Min xfer = 2071084.00 KB </pre>	
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		Children see throughput for 2 random readers = 1428.04 KB/sec Parent sees throughput for 2 random readers = 1428.03 KB/sec Min throughput per process = 708.96 KB/sec Max throughput per process = 719.08 KB/sec Avg throughput per process = 714.02 KB/sec Min xfer = 2067652.00 KB Children see throughput for 2 mixed workload = 1342.09 KB/sec Parent sees throughput for 2 mixed workload = 1342.09 KB/sec Min throughput per process = 113.39 KB/sec Max throughput per process = 1228.69 KB/sec Avg throughput per process = 671.04 KB/sec Min xfer = 193544.00 KB Children see throughput for 2 random writers = 1293.31 KB/sec Parent sees throughput for 2 random writers = 1281.14 KB/sec Min throughput per process = 640.55 KB/sec Max throughput per process = 652.76 KB/sec Avg throughput per process = 646.65 KB/sec Min xfer = 2057916.00 KB	
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		Children see throughput for 2 pwrite writers = 372.07 KB/sec Parent sees throughput for 2 pwrite writers = 372.07 KB/sec Min throughput per process = 186.03 KB/sec Max throughput per process = 186.04 KB/sec Avg throughput per process = 186.04 KB/sec Min xfer = 2097144.00 KB Children see throughput for 2 pread readers = 19156.10 KB/sec Parent sees throughput for 2 pread readers = 19154.74 KB/sec Min throughput per process = 9547.76 KB/sec Max throughput per process = 9608.34 KB/sec Avg throughput per process = 9578.05 KB/sec Min xfer = 2084200.00 KB	
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