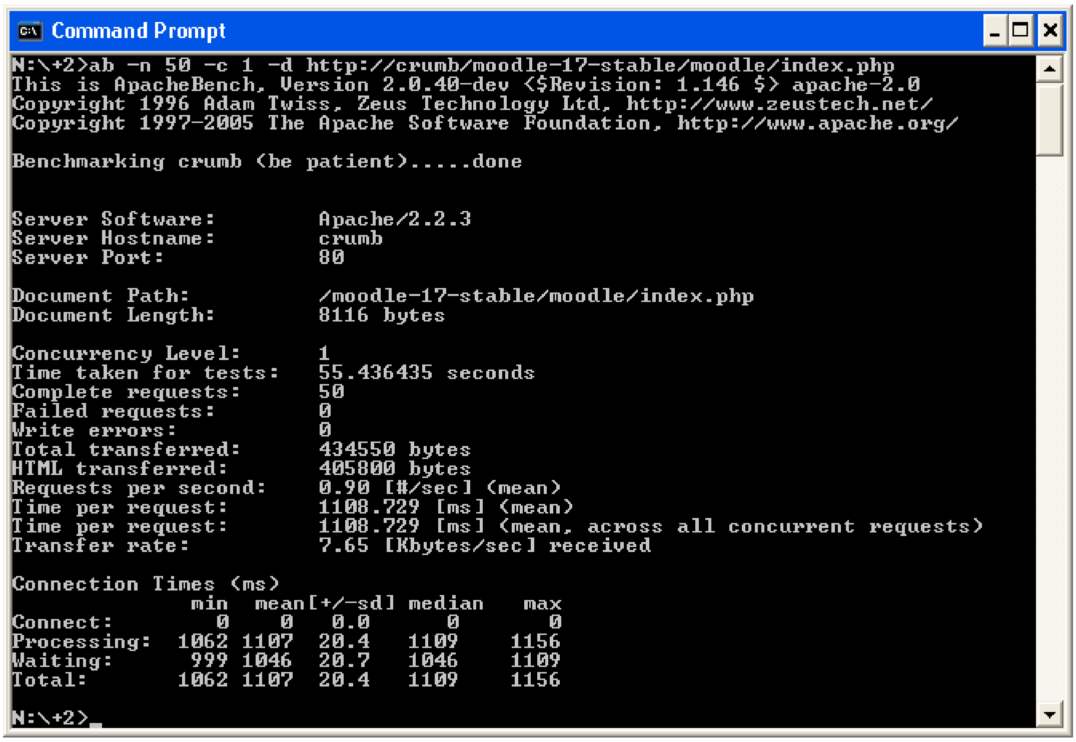
3.7 Install the Alternative PHP Cache (APC)

APC (Alternative PHP Cache) is a PHP opcode cache. It stores php pages in RAM and reduces hard disk activity. This makes a real difference to Moodle.

References:
- Main website and documentation is at http://uk.php.net/apc.
- Main download page is http://pecl4win.php.net/ext.php/php_apc.dll
- For the full package go to http://pecl.php.net/package/apc.

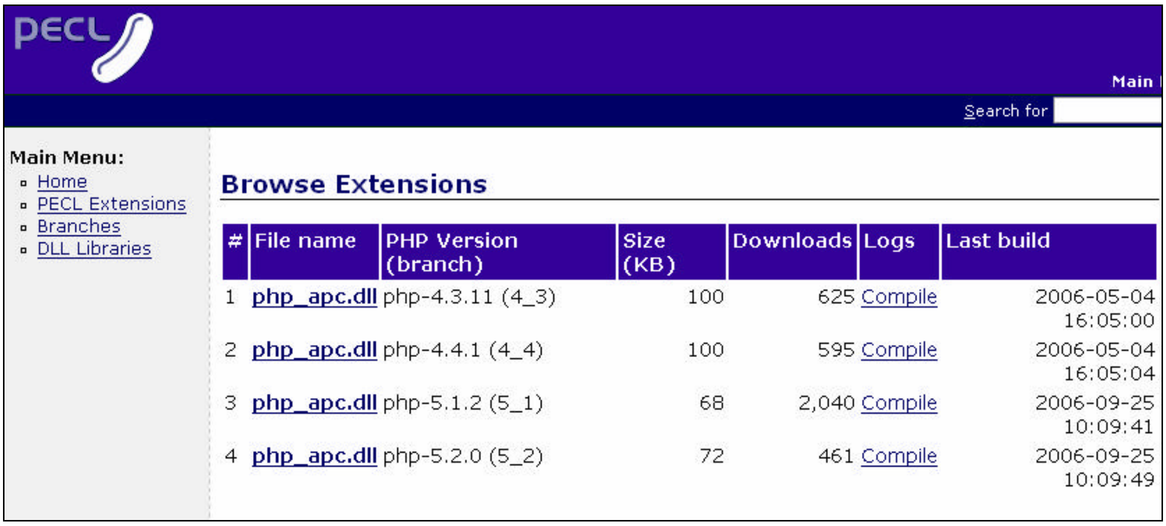
84. Obtain a benchmark for your website:
    - Use ab.exe from the apache downloads site.
    - Run as follows:



```
N:\+2>ab -n 50 -c 1 -d http://crumb/moodle-17-stable/moodle/index.php
This is ApacheBench, Version 2.0.40-dev <$Revision: 1.146 $> apache-2.0
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Copyright 1997-2005 The Apache Software Foundation, http://www.apache.org/

Benchmarking crumb (be patient).....done


Server Software:        Apache/2.2.3
Server Hostname:        crumb
Server Port:            80

Document Path:          /moodle-17-stable/moodle/index.php
Document Length:        8116 bytes

Concurrency Level:      1
Time taken for tests:   55.436435 seconds
Complete requests:      50
Failed requests:        0
Write errors:           0
Total transferred:      434550 bytes
HTML transferred:       405800 bytes
Requests per second:    0.90 [#/sec] (mean)
Time per request:       1108.729 [ms] (mean)
Time per request:       1108.729 [ms] (mean, across all concurrent requests)
Transfer rate:          7.65 [Kbytes/sec] received

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:        0    0   0.0      0       0
Processing:  1062 1107  20.4   1109    1156
Waiting:      999 1046  20.7   1046    1109
Total:       1062 1107  20.4   1109    1156

N:\+2>_
```

So the site takes an average of 1108ms to serve 50 requests to moodle/index.php, with an average transfer rate of 7.65kb/s. This is the figure that we need to improve on.

85. Download APC as follows:
    - Download the windows binary for the PHP version you have installed from http://pecl4win.php.net/ext.php/php_apc.dll and save into the PHP extensions folder, which is `c:\php\ext` by default.



Main Menu:
- Home
- PECL Extensions
- Branches
- DLL Libraries

Browse Extensions

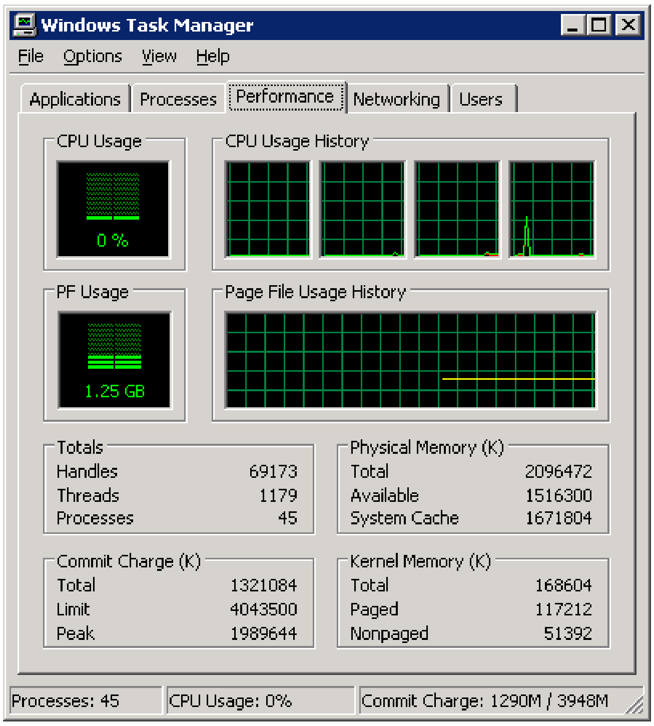
#	File name	PHP Version (branch)	Size (KB)	Downloads	Logs	Last build
1	php_apc.dll	php-4.3.11 (4_3)	100	625	Compile	2006-05-04 16:05:00
2	php_apc.dll	php-4.4.1 (4_4)	100	595	Compile	2006-05-04 16:05:04
3	php_apc.dll	php-5.1.2 (5_1)	68	2,040	Compile	2006-09-25 10:09:41
4	php_apc.dll	php-5.2.0 (5_2)	72	461	Compile	2006-09-25 10:09:49

Note: Make sure you choose the right extension for your version of PHP.

86. Install as follows:
- Edit the php.ini file and add the following line in the extensions section:

```
extension = php_apc.dll
```

- Check the physical free space available to the server in task manager:



CPU Usage: 0 %
PF Usage: 1.25 GB

Totals	
Handles	69173
Threads	1179
Processes	45

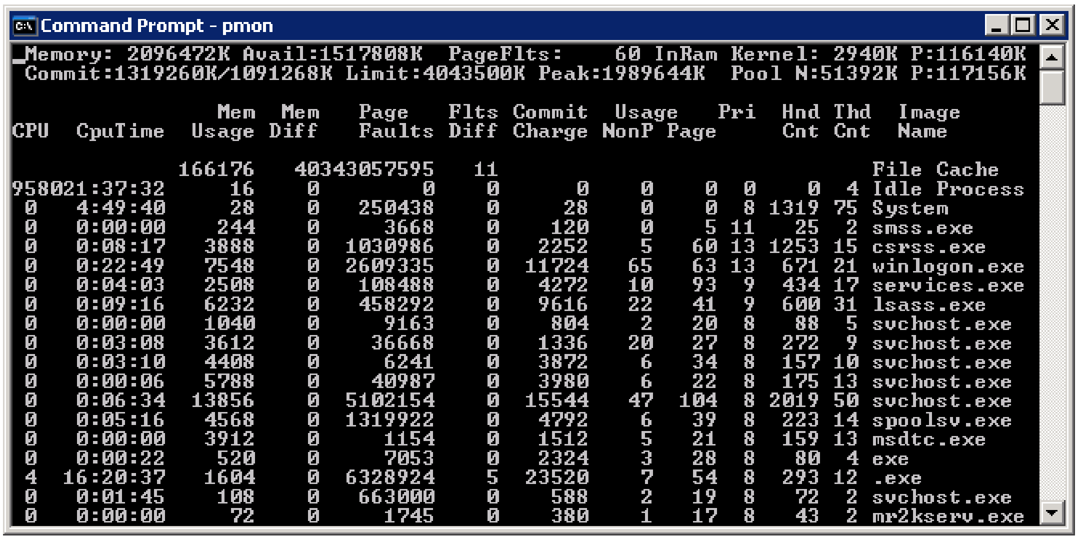
Physical Memory (K)	
Total	2096472
Available	1516300
System Cache	1671804

Commit Charge (K)	
Total	1321084
Limit	4043500
Peak	1989644

Kernel Memory (K)	
Total	168604
Paged	117212
Nonpaged	51392

Processes: 45 | CPU Usage: 0% | Commit Charge: 1290M / 3948M

Or alternatively use top (PMON.EXE):



```
 Memory: 2096472K Avail:1517808K  PageFlts:    60 InRam Kernel: 2940K P:116140K
 Commit:1319260K/1091268K Limit:4043500K Peak:1989644K  Pool N:51392K P:117156K

                Mem  Mem   Page   Flts Commit  Usage   Pri  Hnd Thd  Image
CPU  CpuTime  Usage Diff   Faults Diff Charge NonP Page     Cnt Cnt  Name

             166176   40343057595   11                             File Cache
958021:37:32     16    0        0    0      0    0    0  0    0  4 Idle Process
 0   4:49:40     28    0   250438    0     28    0    0  8 1319 75 System
 0   0:00:00    244    0     3668    0    120    0    5 11   25  2 smss.exe
 0   0:08:17   3888    0  1030986    0   2252    5   60 13 1253 15 csrss.exe
 0   0:22:49   7548    0  2609335    0  11724   65   63 13  671 21 winlogon.exe
 0   0:04:03   2508    0   108488    0   4272   10   93  9  434 17 services.exe
 0   0:09:16   6232    0   458292    0   9616   22   41  9  600 31 lsass.exe
 0   0:00:00   1040    0     9163    0    804    2   20  8   88  5 svchost.exe
 0   0:03:08   3612    0    36668    0   1336   20   27  8  272  9 svchost.exe
 0   0:03:10   4408    0     6241    0   3872    6   34  8  157 10 svchost.exe
 0   0:00:06   5788    0    40987    0   3980    6   22  8  175 13 svchost.exe
 0   0:06:34  13856    0  5102154    0  15544   47  104  8 2019 50 svchost.exe
 0   0:05:16   4568    0  1319922    0   4792    6   39  8  223 14 spoolsv.exe
 0   0:00:00   3912    0     1154    0   1512    5   21  8  159 13 msdtc.exe
 0   0:00:22    520    0     7053    0   2324    3   28  8   80  4 exe
 4  16:20:37   1604    0  6328924    5  23520    7   54  8  293 12 .exe
 0   0:01:45    108    0   663000    0    588    2   19  8   72  2 svchost.exe
 0   0:00:00     72    0     1745    0    380    1   17  8   43  2 mr2kserv.exe
```

Here we have 1709268K free = 1669Mb free. Deduct 20% for overheads gives 1335Mb free. So we can set APC cache to 30% of this = 400Mb (round up to 512Mb).

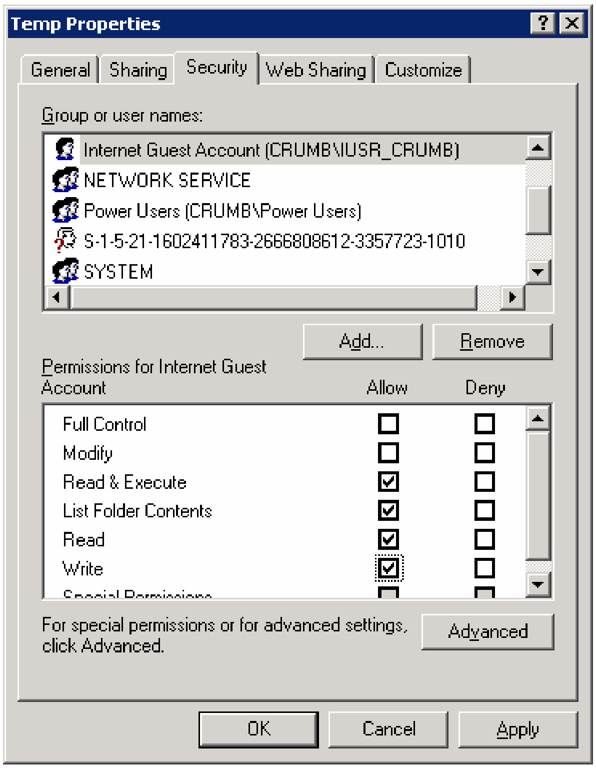
However, it is best to start low so a setting of 32Mb at first is best and increase if the Cache Full Count is non-zero. In practice a normal Moodle site needs around 48Mb – one with lots of filters, etc needs 64Mb, but you should monitor the Cache Full Count variable (see later).

- Add the following at the end of the php.ini file to create a 32Mb cache (1 segment of 32Mb in size):

```
[APC]
apc.enabled = 1
apc.shm_segments = 1
apc.shm_size = 32
apc.optimization = 0
apc.num_files_hint = 1000
apc.ttl = 0
apc.gc_ttl = 3600
apc.cache_by_default = On
apc.slam_defense = 0
apc.file_update_protection = 2
apc.enable_cli = 0
apc.stat=1
```

- Note the `apc.stat` variable. If you do not set this to the value of ‘1’, you may get blank pages.

87. Install: Set temp directory
- APC needs a temporary directory to save its files. Set the C:\WINDOWS\TEMP directory to be writable by the web server user (IUSR_machine-name).



Group or user names:

- Internet Guest Account (CRUMB\IUSR_CRUMB)
- NETWORK SERVICE
- Power Users (CRUMB\Power Users)
- S-1-5-21-1602411783-2666808612-3357723-1010
- SYSTEM

Permissions for Internet Guest Account	Allow	Deny
Full Control	☐	☐
Modify	☐	☐
Read & Execute	☑	☐
List Folder Contents	☑	☐
Read	☑	☐
Write	☑	☐
Special Permissions	☐	☐

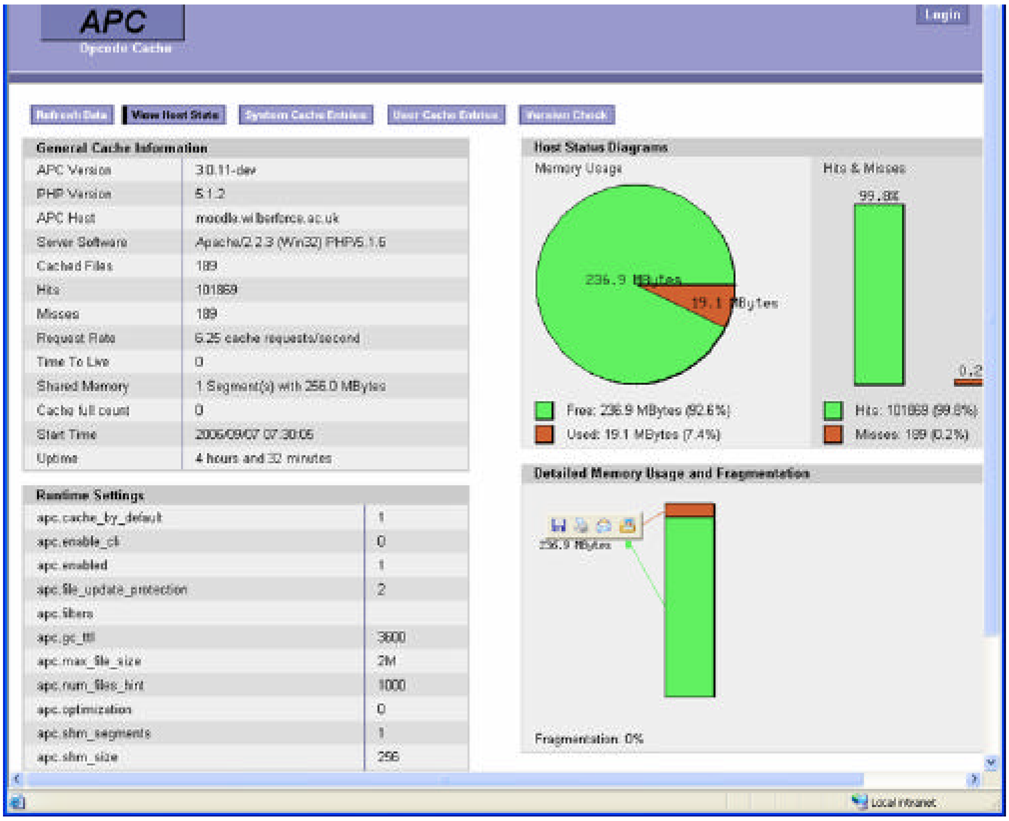
For special permissions or for advanced settings, click Advanced.

88. Install monitoring script
    - Download the APC monitoring file from http://pecl.php.net/package/apc and extract the contents. Save the file `apc.php` into the c:/inetpub/wwwroot folder. This is the file that shows the APC information.

    Note: Once you have successfully installed APC, move this file to a password protected area for security.

89. Restart Apache/IIS.

90. Verify installation
    - Check that APC is working by browsing to http://localhost/apc.php. You should see something like this:



General Cache Information	
APC Version	3.0.11-dev
PHP Version	5.1.2
APC Host	moodle.wilberforce.ac.uk
Server Software	Apache/2.2.3 (Win32) PHP/5.1.6
Cached Files	189
Hits	101869
Misses	189
Request Rate	6.25 cache requests/second
Time To Live	0
Shared Memory	1 Segment(s) with 256.0 MBytes
Cache full count	0
Start Time	2006/09/07 07:30:05
Uptime	4 hours and 32 minutes

Runtime Settings	
apc.cache_by_default	1
apc.enable_cli	0
apc.enabled	1
apc.file_update_protection	2
apc.filters	
apc.gc_ttl	3600
apc.max_file_size	2M
apc.num_files_hint	1000
apc.optimization	0
apc.shm_segments	1
apc.shm_size	256

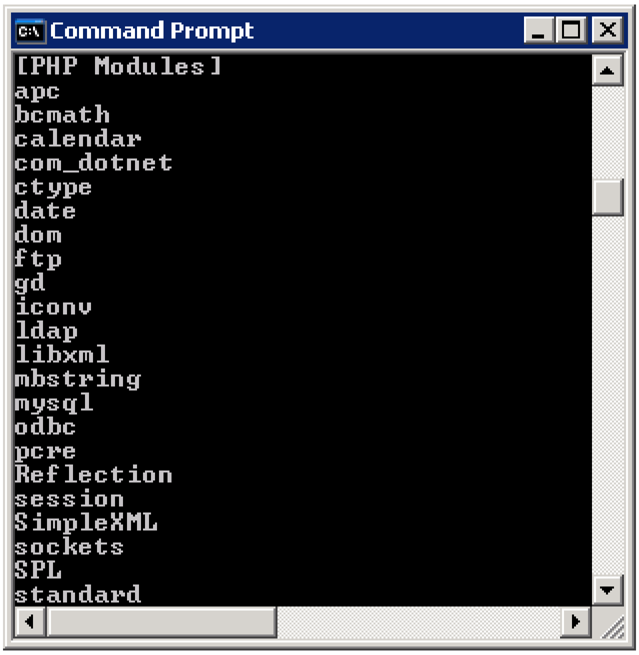
🟩 Free: 236.9 MBytes (92.6%)
🟥 Used: 19.1 MBytes (7.4%)

🟩 Hits: 101869 (99.8%)
🟥 Misses: 189 (0.2%)

Fragmentation: 0%

Note: Watch the Cache full count and the Fragmentation %. If Cache Full count > 0, increase the memory allocation (apc_shm_size).

- Check that APC has installed as a module with php –m:

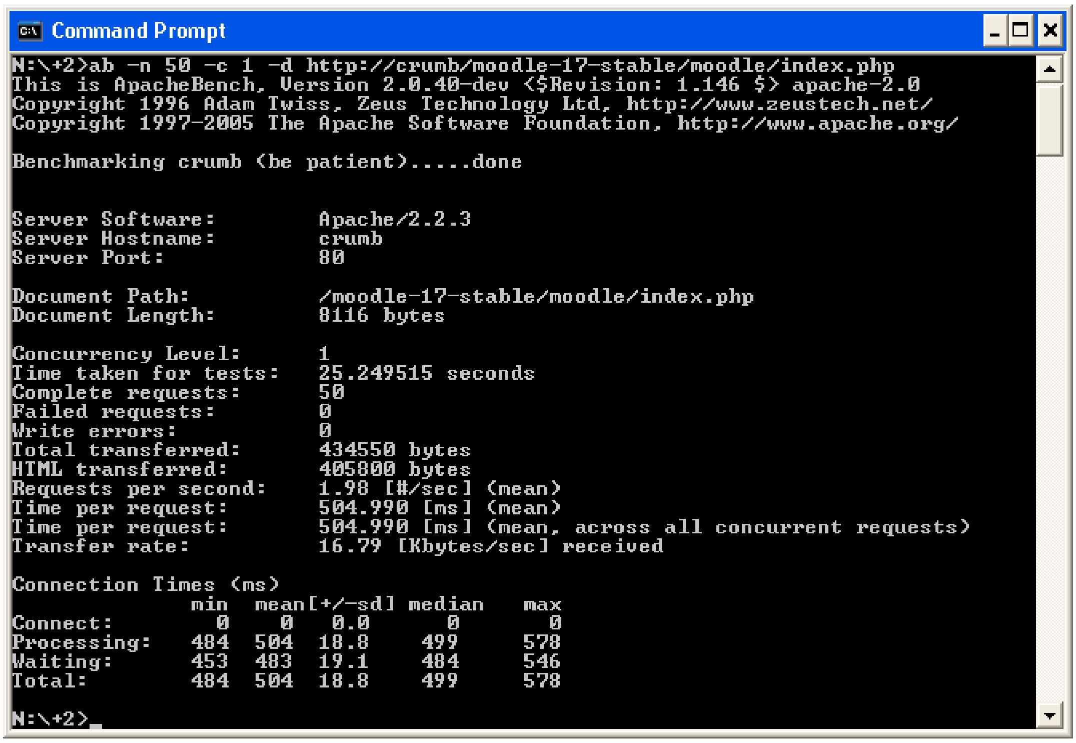


```
[PHP Modules]
apc
bcmath
calendar
com_dotnet
ctype
date
dom
ftp
gd
iconv
ldap
libxml
mbstring
mysql
odbc
pcre
Reflection
session
SimpleXML
sockets
SPL
standard
```

91. Check the site performance:
- Our original figures were:
Transfer rate : 7.65Kb/s

Time per request: 1108ms

- Re-run ab.exe with the same parameters.



```
N:\+2>ab -n 50 -c 1 -d http://crumb/moodle-17-stable/moodle/index.php
This is ApacheBench, Version 2.0.40-dev <$Revision: 1.146 $> apache-2.0
Copyright 1996 Adam Twiss, Zeus Technology Ltd, http://www.zeustech.net/
Copyright 1997-2005 The Apache Software Foundation, http://www.apache.org/

Benchmarking crumb (be patient).....done


Server Software:        Apache/2.2.3
Server Hostname:        crumb
Server Port:            80

Document Path:          /moodle-17-stable/moodle/index.php
Document Length:        8116 bytes

Concurrency Level:      1
Time taken for tests:   25.249515 seconds
Complete requests:      50
Failed requests:        0
Write errors:           0
Total transferred:      434550 bytes
HTML transferred:       405800 bytes
Requests per second:    1.98 [#/sec] (mean)
Time per request:       504.990 [ms] (mean)
Time per request:       504.990 [ms] (mean, across all concurrent requests)
Transfer rate:          16.79 [Kbytes/sec] received

Connection Times (ms)
              min  mean[+/-sd] median   max
Connect:        0    0   0.0      0       0
Processing:   484  504  18.8    499     578
Waiting:      453  483  19.1    484     546
Total:        484  504  18.8    499     578

N:\+2>_
```

Our new figures show a 50% improvement (Transfer rate: 16.79kb/s, Time per request: 504ms).

Hurrah!