

OPTIMIZATION REPORT

1. OBJECTIVES:

A. Goals :

The main aim of the project is Performance Assessment of Moodle and creates a baseline for the same. In this, we are finding performance issue and ways to fix them.

Moodle stands for acronym for modular object-oriented dynamic learning environment . Moodle is a LMS ie a Learning Management System. Moodle is used for blended learning, distance education, flipped classroom and other e-learning projects in schools, universities, workplaces and other sectors.

In this part of the test we are interested in finding the optimizations that leads to better performance.

B. Deployment Infrastructure :

1] Target Infrastructure:

i. Hardware Configurations :

16Gb RAM

Processor : Octa Core

ii. Software Configurations :

OS : Ubuntu 14.04

Database : MySQL

Language : PHP

2] Test Infrastructure :

i. Load Generator:

8Gb RAM

Processor: Quad Core

ii. Tools :

Jmeter 3,Gatling 2.2.2, SAR

The instance of moodle used for this test was deployed on 172.22.22.11.

2. MOODLE METRICS

The metrics that we would be interested wrt Moodle are :

- Number of courses offered
- Number of users
- Types of courses
- Types of users

The values for the above metrics are:

Total Number of courses :250

Types of courses:

1. Large courses:25
2. Medium courses:130
3. Small courses:65
4. Extra small courses :30
5. Number of users:100,000

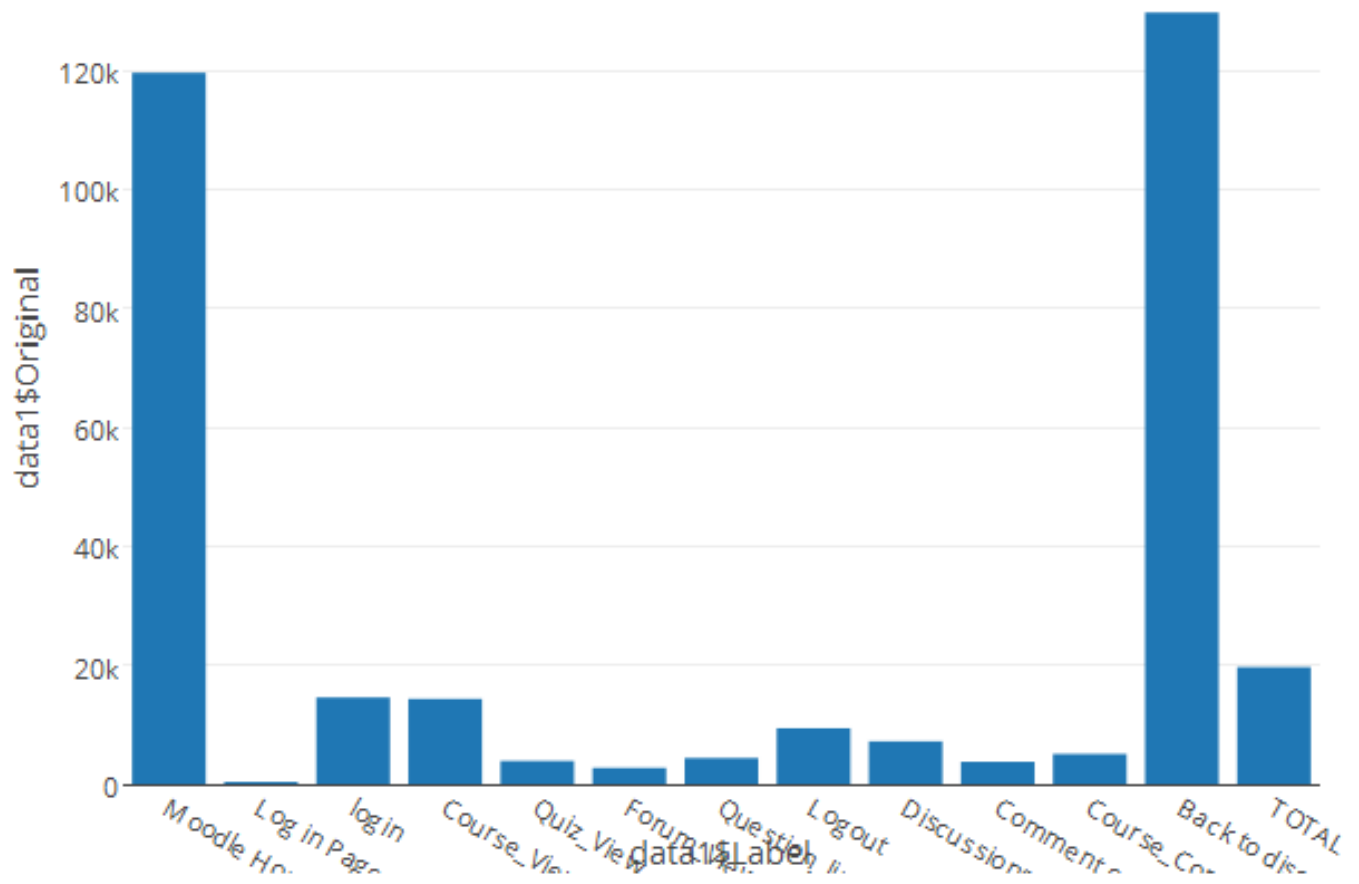
3.OPTIMIZATIONS AND NEED FOR IT

We performed the testing of Moodle for different load levels. The results obtained even for a single user were higher than the expected value (The value of response time to be less than 5seconds for every request). This problem made us do various changes that would help in improving the performance of the system as whole.

The results for a test with load of 50 users in which the users are divided to perform tasks like reading, commenting on a forum and attempting a quiz.(This scenario will be assumed for further comparison)

RESULTS:

Label	Average
Moodle Homepage	119626
Log in Page	68
login	14567
Course_View	14323
Forum_View	3886
Quiz_View	2720
Discussions	4373
Course_Contents	9388
Question_list	7190
Comment on post	3744
Back to discussion page	5060
Logout	129749
TOTAL	19663



A)Disabling Debugging Mode:

1)Problem and respective Solution:

The response time of every request was higher than the accepted value.(The expected value s per our SLA is 5seconds. i.e. every request must have a response time of less than 5 seconds.)

Going through the settings and logs of the deployment we realised that the Debugging mode generally used by the developers was enabled. This created an overhead and lead to the increase in response time. The way in which this could be solved was disabling the Debugging option.

2)Steps to Solution:

Debugging Disabled

Login as Admin

Site Administration>Development>Debugging

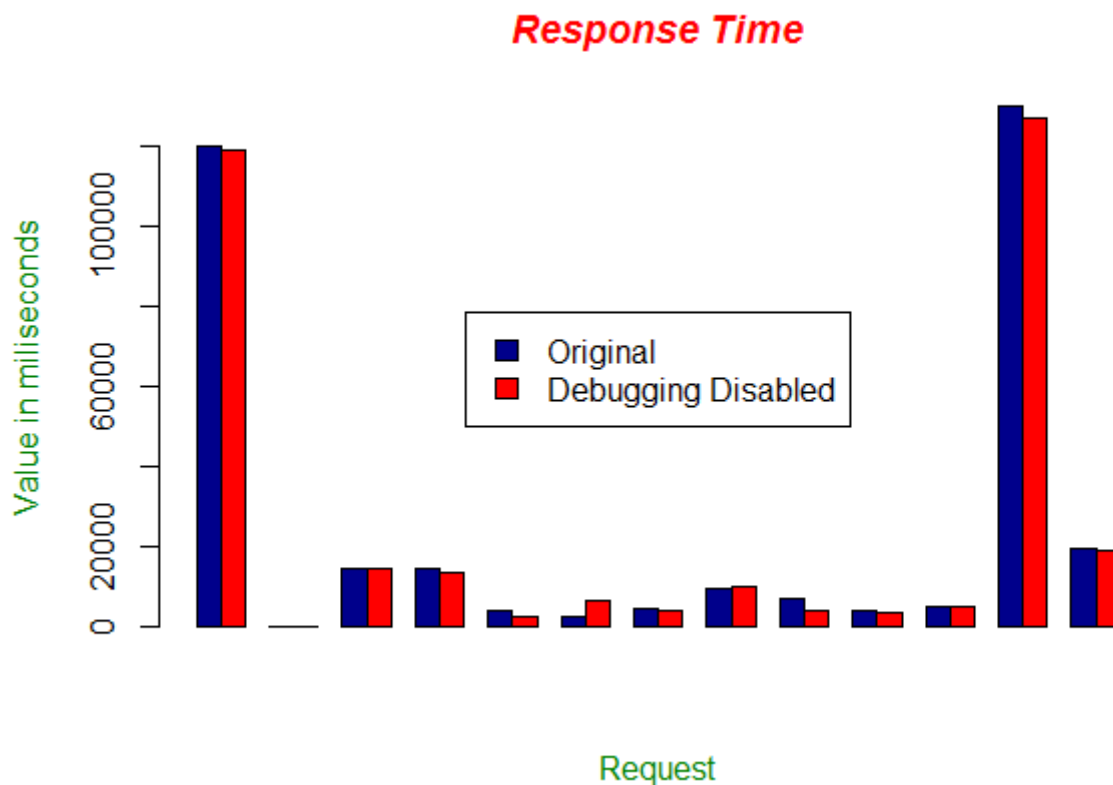
Change Debug message to MINIMAL

Disable display debug message

Logout

3)Comparison :

Label	Original	Debugging Disabled
Moodle Homepage	119626	119100
Log in Page	68	44
login	14567	14233
Course_View	14323	13510
Quiz_View	3886	2653
Forum_View	2720	6352
Question_list	4373	3779
Logout	9388	10051
Discussions	7190	4153
Comment on post	3744	3544
Course_Contents	5060	4843
Back to discussion page	129749	126883
TOTAL	19663	19128



4)Observations:

- There was a fall in the response time for almost all the requests after disabling the debugging settings.
- The improvement in terms of Response Time was not that big a difference. This led us search the other optimizations.
- The memory and CPU utilizations also showed a fall after disabling the Debugging.

As a good practice this mode has been disabled.

B|Reducing the Number of Courses on Homepage:

1)Problem and respective Solution

Another observation was that the response time for the Moodle Homepage was higher than every other request.

A closer look to the Homepage made us realise that the number of courses that were displayed on the homepage were 250. Loading all these courses was a problem due to which there was an increase in the Response time.

The solution to this was reducing the courses to be displayed on the homepage. This solution can be considered to be an apt solution because we don't have to display all the courses at the homepage as once the user logs in he would be able to read the courses that he is interested and also search for a new one if he wishes to. Hence this solution can be said to be a good solution.

2)Steps to Solution:

Reducing Number of courses on HomePage

Login as Admin

Site Administration>Front Page>Front Page Settings

Set Maximum number of courses=20

Logout

3)Comparison :

Label	Original	Debugging Disabled	Fewer Courses
Moodle Homepage	119626	119100	2341
Log in Page	68	44	42
login	14567	14233	12595
Course_View	14323	13510	12785
Quiz_View	3886	2653	2373
Forum_View	2720	6352	3459
Question_list	4373	3779	6038
Logout	9388	10051	2606
Discussions	7190	4153	3832
Comment on post	3744	3544	3242
Course_Contents	5060	4843	9551
Back to discussion page	129749	126883	4493
TOTAL	19663	19128	6478

[illegible]

- Reducing the number of courses reduced the response time of Homepage and Logout page by more than 95%
- Since this technique improved the response time to a large extent this practice will be followed henceforth.

Hence we updated values of certain parameters as per the document and obtained better results

restart

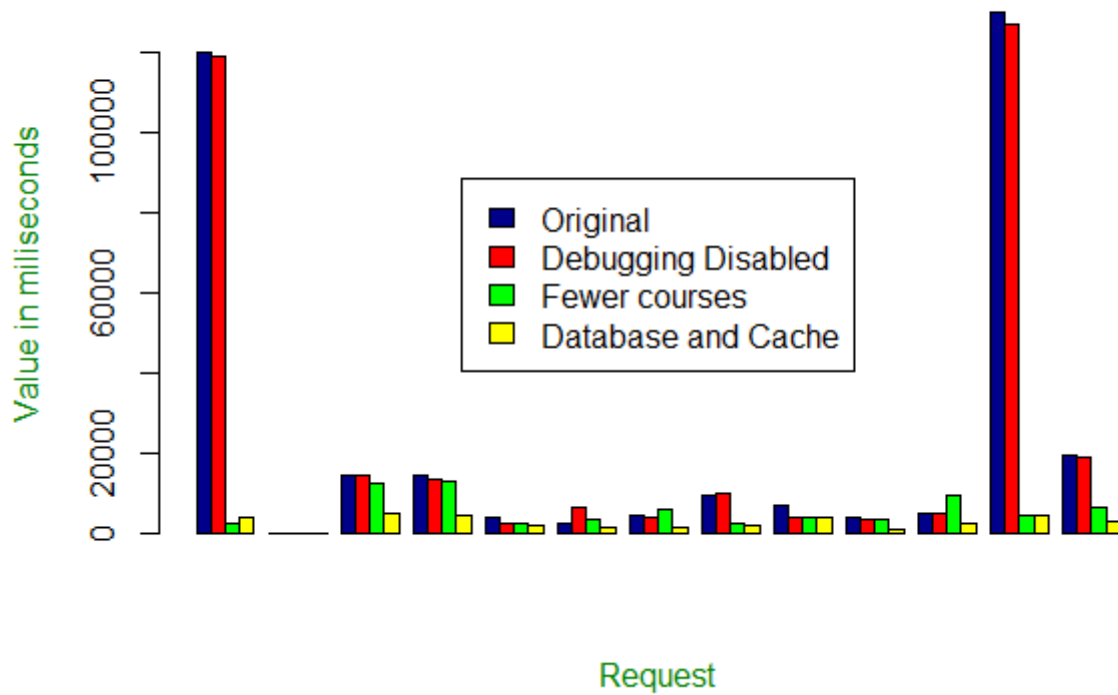
MySQL Settings

Go to mysql database
/home/bitnami/moodle-3.1.1-0/mysql/my.cnf
Add the changed values for
query_cache_size to 268435456
query_cache_type to 1
query_cache_limit to 1048576
Save changes
restart

3)Comparison :

LABEL	A	B	C	D
Moodle Homepage	119626	119100	2341	1274
Log in Page	68	44	42	52
login	14567	14233	12595	1608
Course_View	14323	13510	12785	1326
Quiz_View	3886	2653	2373	688
Forum_View	2720	6352	3459	610
Question_list	4373	3779	6038	1219
Logout	9388	10051	2606	646
Discussions	7190	4153	3832	797
Comment on post	3744	3544	3242	384
Course_Contents	5060	4843	9551	864
Back to discussion page	129749	126883	4493	1361

Response Time

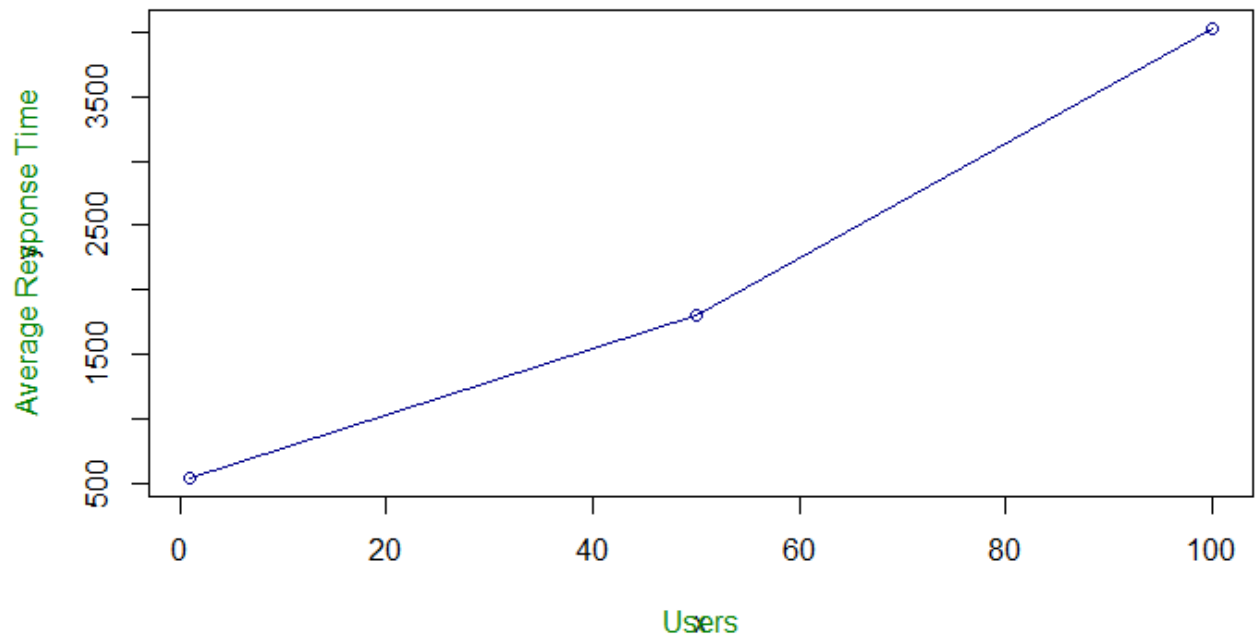


4) Observations:

- The response time was reduced drastically for the homepage and Logout requests.
- As the response time and memory , CPU utilizations were lowered these settings will be applied henceforth for all the tests.

4. SCALABILITY TRENDS:

Scalability Graph



- The value of Response time increases with increase in number of users.
- The increase in Response time is not exponential.

NUMBER OF USERS	1	50	100
AVG. RESPONSE TIME IN milliseconds	546	1809	4026