CSCI 5409 - Cloud Computing – Summer 2018

ASSIGNMENT 5 (Load Balancer on a SAAS)

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Contents

1. URL of web service:

http:// csci5409-a5.mybluemix.net/v1/payload.php/<id>/<payloadsize>

e.g. http://csci5409-a5.mybluemix.net/v1/payload.php/5/10

Note: Our Free account on IBM Cloud is getting expired on **31st July 2018**.

2. Environment/Resources used:

- Windows 10 Home edition
- JetBrains PHPStorm 2018.1.3 editor

  Create this PHP web application using Apache server to test locally before deploying on the cloud.
- Google Chrome 66.0.3359.139 / Firefox 59.0.2/ IE 11 web browsers
- MySQL, HTML 5, CSS 3, PHP 7.1.8 and Apache
- IBM Blumix Cloud
- CF CLI
- Postman [web services testing tool]
- JMeter

  We have used JMeter for Client-Side application for testing. In which we have increased users from 50 to 100 and recorded several results. For your reference kindly find a file which is having different URLs of IDs and Payload sizes (used for JMeter testing).
  URL: https://tinyurl.com/yanj33oy

3. Test Scenarios:

3.1 Main Page

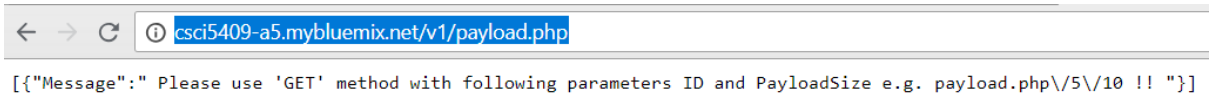

Figure – 1 Main URL view

3.2 Valid Response

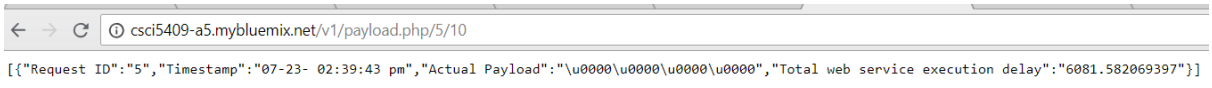

Figure – 2 Valid Response View

3.3 Invalid Response

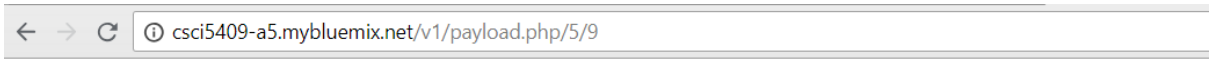

Figure – 3 Invalid Response - Smaller size

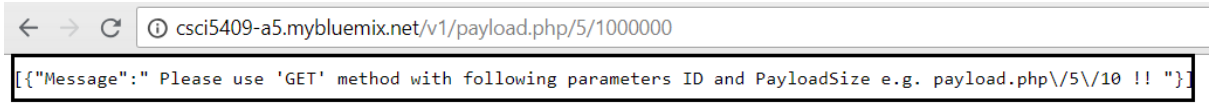

Figure – 4 Invalid Response - Larger Size

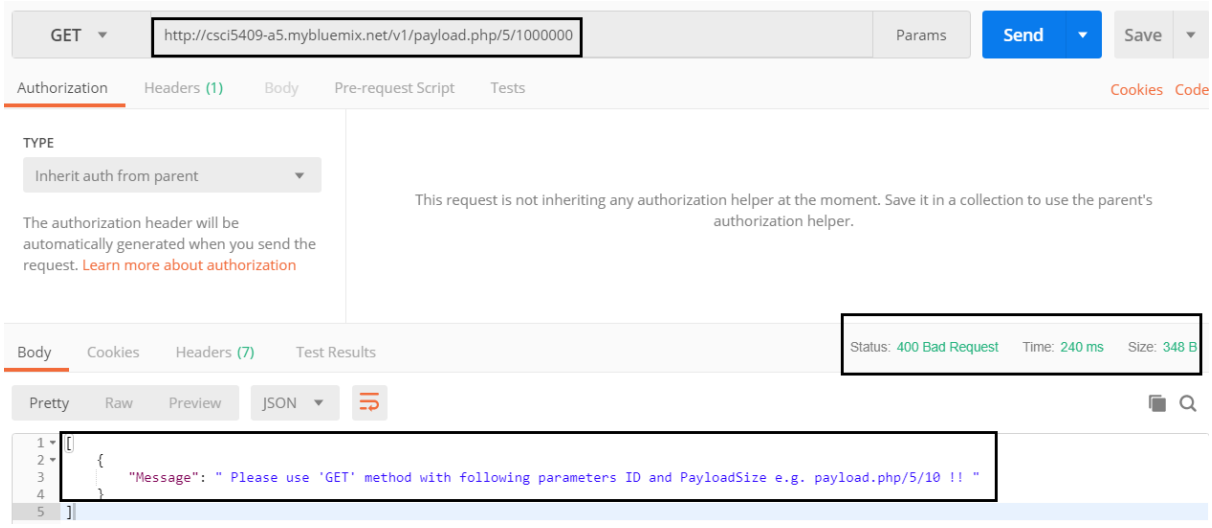

Figure – 5 Invalid Response – 400 Bad Request

3.4 Network Response Time

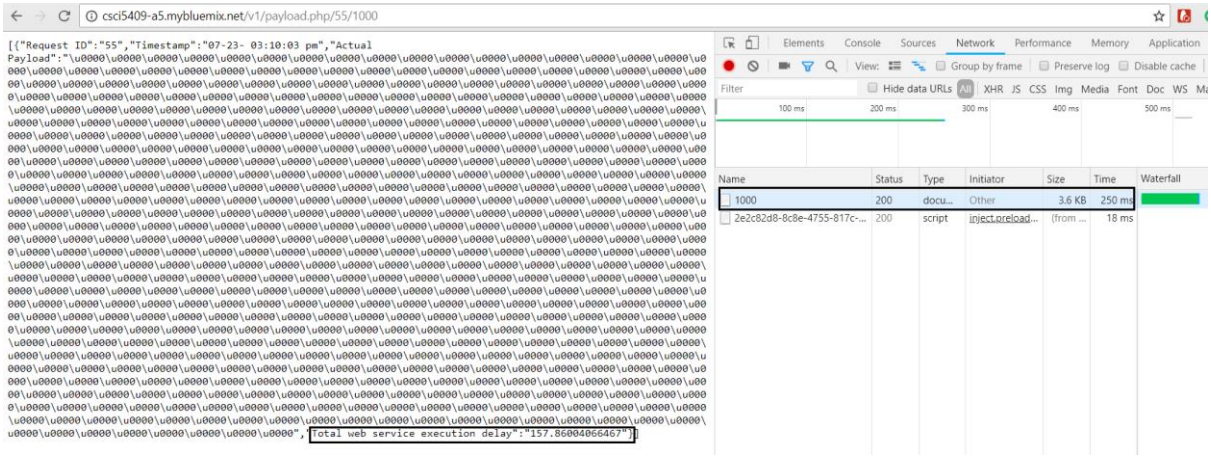

Figure – 6 Google Chrome Network Monitoring for Time Response

Network Response: 250 ms

Web Service Response: 157.86 ms

3.5 Postman Response Time

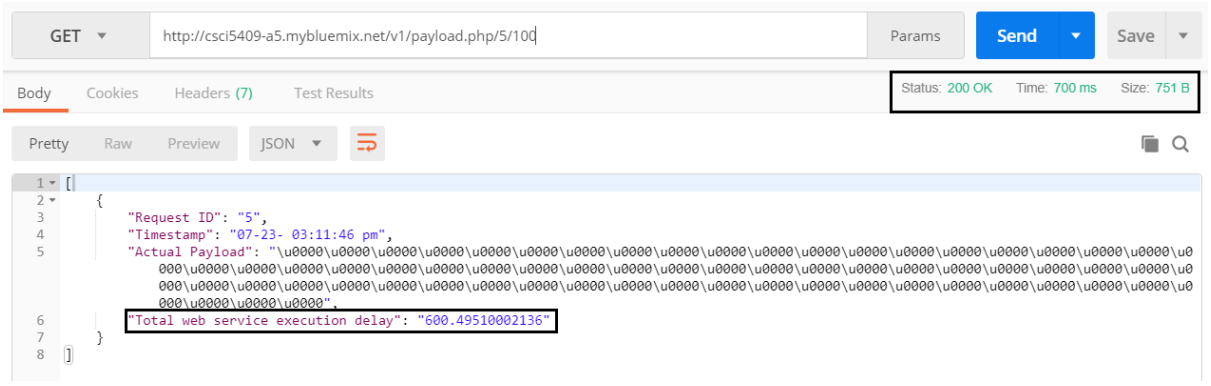

Figure – 7 Valid Response in Postman – 200 OK

Postman Time Response: 700 ms

Web Service Response: 600.49 ms

4. JMeter Response:

4.1 50 - Users Case

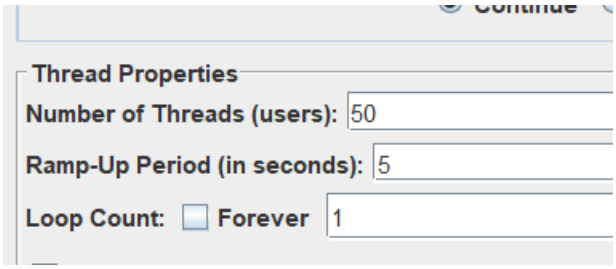

Figure – 8 50 users in JMeter

4.1.1 With Single Instance

Sample #	Start Time	Thread Name	Label	Sample Time(m...	Status	Bytes	Sent Bytes	Latency	Connect Time(...
1	12:15:48.993	Thread Group 1...	HTTP Request	6874		479	145	6874	309
2	12:15:49.093	Thread Group 1...	HTTP Request	7043		366	145	7043	331
3	12:15:49.193	Thread Group 1...	HTTP Request	7461		433	145	7461	296
4	12:15:48.913	Thread Group 1...	HTTP Request	8045		367	145	8045	380

Figure – 9 Single Instance Performance Results

4.1.2 With Two Instances

Sample #	Start Time	Thread Name	Label	Sample Time(m...	Status	Bytes	Sent Bytes	Latency	Connect Time(...
1	12:31:14.669	Thread Group 1...	HTTP Request	4692		367	145	4692	398
2	12:31:14.871	Thread Group 1...	HTTP Request	6403		367	145	6403	303
3	12:31:14.770	Thread Group 1...	HTTP Request	6819		481	145	6819	297
4	12:31:15.075	Thread Group 1...	HTTP Request	8002		373	145	8002	288

Figure – 10 Two Instances Performance Results

4.1.3 Comparison Chart

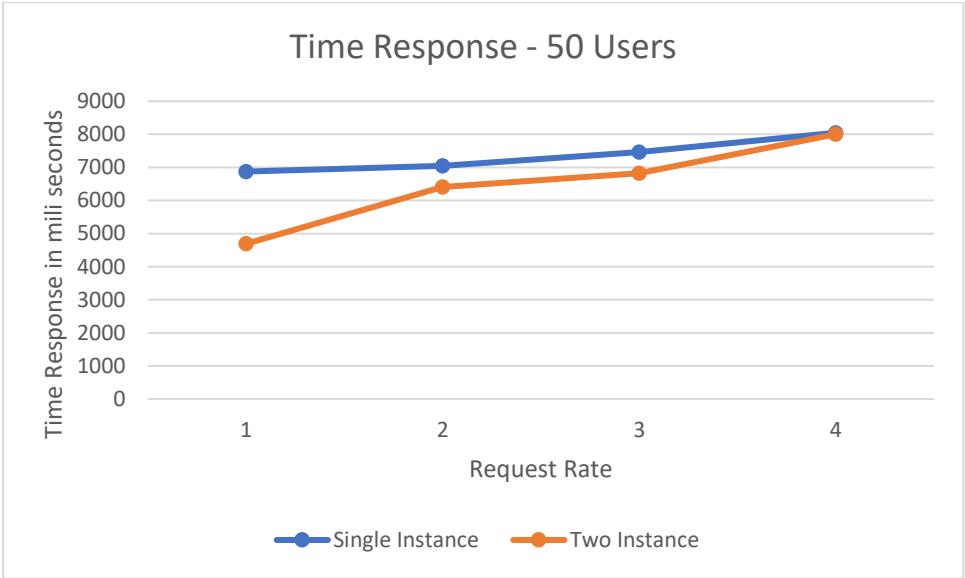

Figure – 11 Comparison Chart – 50 users

Request Rate	With Single Instance (ms)	With Two Instances (ms)
1	6874	*4692*
2	7043	*6403*
3	7461	*6819*
4	8045	*8002*

Table 1: Comparison of time delay – 50 users

Here, one can see that with the single instance of 1 GB memory time response is floating around 7000 ms approximately and as we have added another instance of 1 GB memory, time response is decreased to a certain level.

4.2 100 Users Case

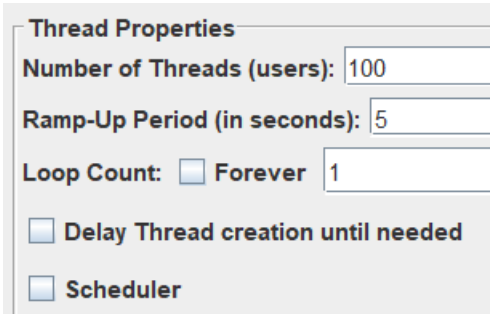

Figure – 12 100 users in JMeter

4.2.1 With Single Instance

Sample #	Start Time	Thread Name	Label	Sample Time(m...	Status	Bytes	Sent Bytes	Latency	Connect Time(...
1	12:36:34.070	Thread Group 1...	HTTP Request	27826		373	145	27826	308
2	12:36:33.970	Thread Group 1...	HTTP Request	28261		367	145	28261	284
3	12:36:33.921	Thread Group 1...	HTTP Request	28758		480	145	28758	307
4	12:36:33.870	Thread Group 1...	HTTP Request	29798		366	145	29797	312

Figure – 13 Single Instance Performance Results

4.2.2 With Two Instances

Sample #	Start Time	Thread Name	Label	Sample Time(m...	Status	Bytes	Sent Bytes	Latency	Connect Time(...
1	12:33:19.039	Thread Group 1...	HTTP Request	8786		481	145	8786	311
2	12:33:19.089	Thread Group 1...	HTTP Request	9067		367	145	9067	297
3	12:33:18.989	Thread Group 1...	HTTP Request	9246		367	145	9245	380
4	12:33:19.140	Thread Group 1...	HTTP Request	10043		433	145	10043	300

Figure – 14 Two Instances Performance Results

4.2.3 Comparison Chart

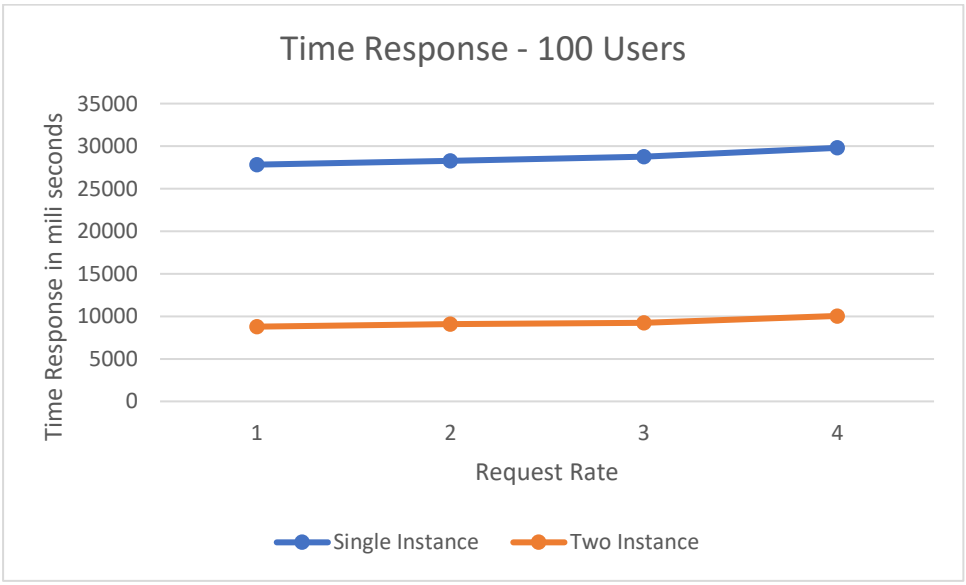

Figure – 15 Comparison Chart – 100 users

Request Rate	With Single Instance (ms)	With Two Instances (ms)
1	27826	*8786*
2	28261	*9067*
3	28758	*9246*
4	29798	*10043*

Table 2 - Comparison of time delay – 100 users

Now we have increased the users to 100 in JMeter and measured the response for a single instance (1 GB memory) which is floating around 28000 ms approximately. Later, we have added another instance of 1 GB memory which shows the significant improvement in the time response. Now with the added instance, the response is floating around 9000 ms approximately.

4.3 Instance Configuration

We have assigned 1 GB memory to the single instance and IBM Bluemix is only giving 2 GB memory total for the application. Hence, we couldn't increase the number of instances more than 2.

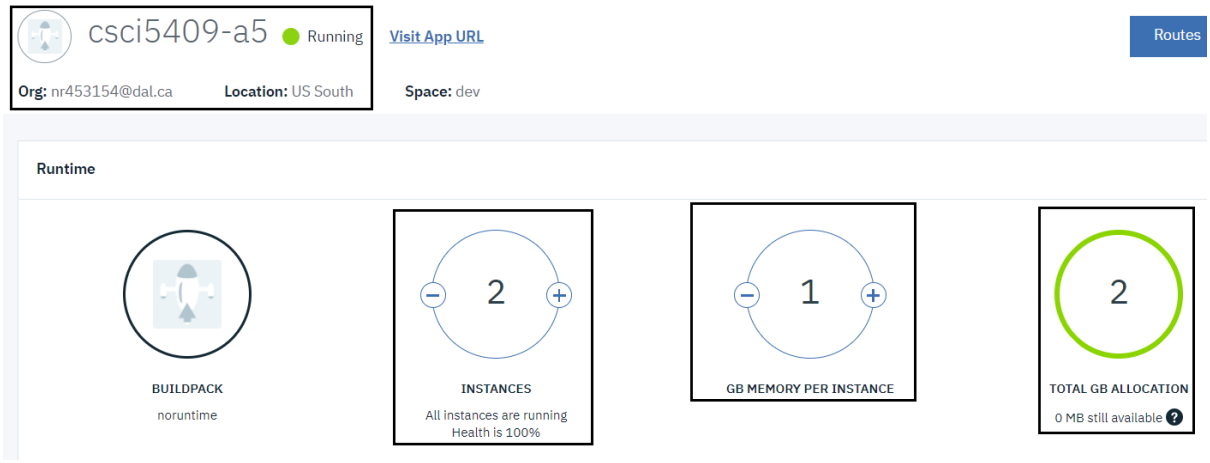

Figure – 16 IBM Instances Configuration

5. Reference:

PHP Syntax has been referred from PHP manual (php.net) and W3School (https://www.w3schools.com/)

- https://www.whileifblog.com/2010/07/19/php-calculate-script-execution-time/
- https://speed.hetzner.de/
- https://stackoverflow.com/questions/16854986/jmeter-testing-multiple-urls