PERFORMANCE DOCUMENT

Webkul Multi Vendor Marketplace for Adobe Commerce

A Product of
Webkul Software

Preface _

> Magento is an eCommerce ecosystem designed for all to build and scale your business. It's a free and open-source eCommerce frame work that offers you a wide range of functionality and lets you have total control of your store. Built on top of Zend Framework.

AWS CLOUD PLATFORM
Server Configuration _

Name	Value
EC2 Instance (ubuntu)	20.04
AWS RDS MySql	8.0
Magento 2 Version	2.4.3-p1
Elastic Search Version	7.9.0
Webkul Marketplace Multi-Vendor Module	5.0.3
AWS EC2 Instance Size (RAM)	t2.large (8 GB)
AWS Database Instance Size (RAM)	t3.large (8 GB)
AWS EBS SSD	30 GB
SWAP MEMORY	4 GB
EC2 vCPU	2
DB Instance vCPU	2

Magento 2 Benchmarking with Webkul Multi-Vendor Module using JMeter

What is Apache JMeter ?

The **Apache JMeter**™ application is open-source software, a 100% pure Java Application designed to load test functional behavior and measure performance. It was originally designed for testing Web Applications but has since expanded to other test functions.

What is the Concurrency Thread Group in JMeter?

JMeter **'Concurrency Thread Group' plugin** is one of the external plugins which is used to design the step-up test type work load model. Using Concurrency Thread Group you can apply conditional load on the server. It is intended to maintain the level of concurrency, which means starting additional during the run time threads if there's not enough of them running in parallel.

What are the input fields used in this whole task let's have a look:

- **Target Concurrency :** Total number of threads (users) in the test.
- **Ramp-Up Time (min) :** Total Ramp-Up duration in minutes. You can also provide Ramp-Up duration in seconds by choosing 'seconds' in the 'Time Unit' option given below the scenario chart.
- **Ramp-Up Steps Count :** Total number of steps in which a group of threads (users) will Ramp-Up.
- **Hold Target Rate Time (min) :** The steady-state when all the threads are active. This is also called a system monitoring window.

Benchmarking Scenarios _

> There are five scenarios in Magento 2 Benchmarking

1. User Sign up
2. User Login
3. Add to Cart
4. Home Page
5. Browsing Different Products

Elements used in _

- HTTPS Script Recorder
- CSV Data Config Element
- Post Processor : CSS Extractor
- HTTP Cookie Manager
- Recording Controller
- User Credentials CSV File
- Listener : Summary Report & View Tree Result
- Simple Data Writer

Thread Group _

- Number of Threads (Users) : 100, 300, 500
- Ramp-Up Period : Various
- Post Processor : CSS Extractor
- Ramp-Up Steps : Various
- Hold on Target : Various

HTML DashBoard _

> All the pie-charts and response time graphs mentioned in the doc have been generated on the following reading.

- Number of Threads : 500
- Ramp-Up : 0 (seconds)

Apache & MySql Maximum Connections Handling Capacity _

> All the pie-charts and response time graphs mentioned in the doc have been generated on the following reading.

1. Apache Server : 600 Connections
2. MySql Database : 550 Connections

Apache Prefork MPM Module _

> The Prefork MPM handles many simultaneous connections. It has multiple child processes with one thread each. Each process handles one connection at a time.

> Parameters of Prefork MPM Module

- **Server Limit :** The maximum configured value for Max Clients for the lifetime of the process. If **Max Clients** is set to a value higher than the default, the **Server Limit** value should be specified above the rest of the parameters.
- **Start Servers :** Initial **number of processes** to start used only on **startup.**
- **Min Spare Servers :** Default values should **suffice requirements** to handle a **heavy load**. During operation, these values regulate how the parent process creates **children to serve requests.**
- **Max Spare Servers :** Default values should **suffice requirements** to handle a **heavy load.** During operation, these values regulate how the parent process creates **children to serve requests.**

- **Max Request Workers :** Maximum number of **child processes** allowed to run. In the case of **prefork**, this is the number of concurrent requests that **Apache** can handle. Because in **prefork** configuration, each child process handles one **request at a time.**
- **Max Connections Per Child :** Number of requests sent to each child process. **0** indicates the process never **expires/dies.**

Tweaked Settings for Prefork MPM (mpm_prefork.conf) to handle 500 concurrent users _

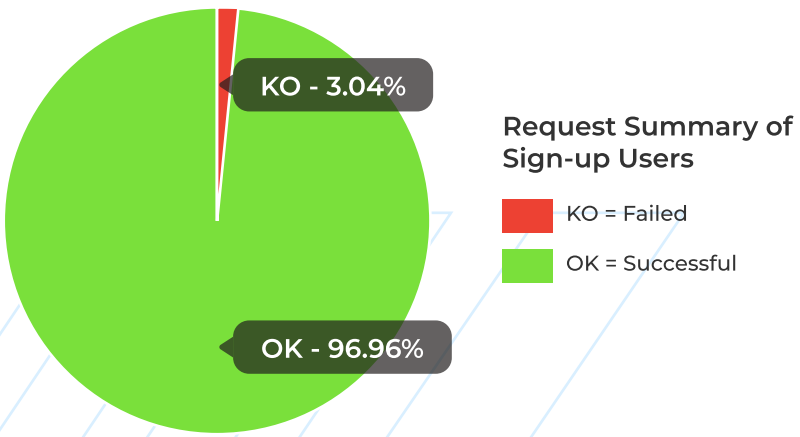
- Server Limit 600
- Start Servers 5
- Min Spare Servers 30
- Max Spare Servers 40
- Max Request Workers 600
- Max Connections Per Child 0

1. User Sign up

I have first recorded the Sign-up test using the JMeter HTTPS recorder in this scenario, then pass all user credentials into the CSV data set config. Magento 2 produces one form_key when we are using the CSS Extractor to execute the operations.

Cases	Users	Ramp-Up	Ramp-Up Steps	Hold on Target	Error%	Sign-Up Users
1	100	0	0	0	0.00	100
2	200	0	0	0	0.00	200
3	300	0	0	0	0.00	300
4	400	0	0	0	1.02	396
5	500	0	0	0	3.04	481

Requests Summary



Response Time Graph _

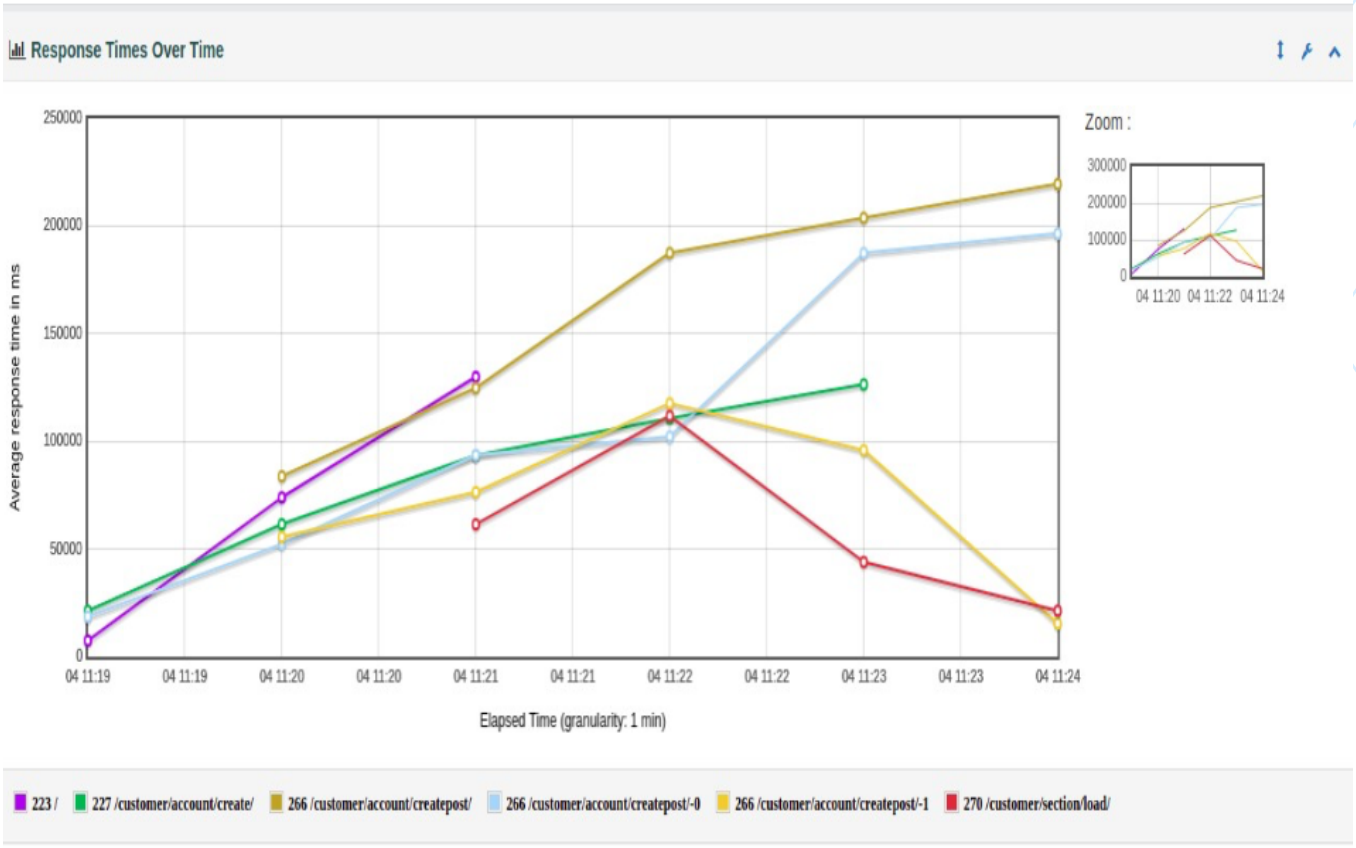


Fig 1: Response Over Time Graph of Sign-up Users

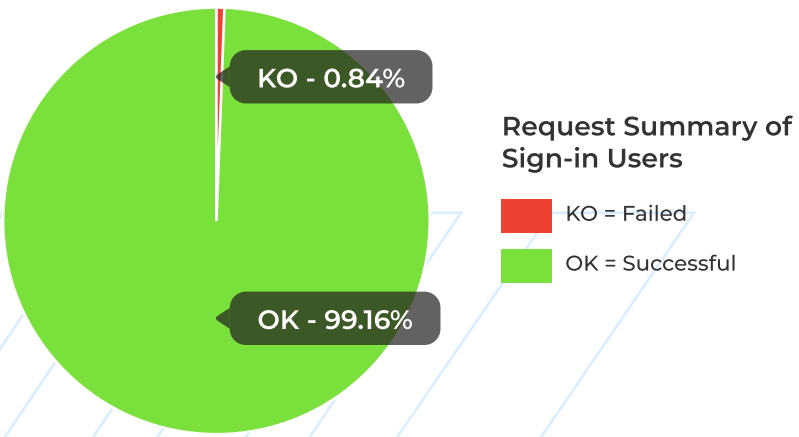
Y-axis - It represents the response time in second or millisecond metrics.
X-axis - It shows the elapsed time. The elapsed time may be relative time or actual time as per the graph's setting.

2. User Login

> In this scenario, all users generated in the previous scenario using JMeter have to Log-in to assess login performance with concurrent users. On JMeter, this scenario was succesfully executed and the users logged in successfully.

Case	Users	Ramp-Up	Ramp-Up Steps	Hold on Target	Constant Timer(MS)	Error%
1	100	0	0	0	0	0.00
2	200	0	0	0	0	0.00
3	300	0	0	0	0	0.00
4	400	0	0	0	0	0.00
5	500	0	0	0	0	0.84

Requests Summary



Response Time Graph _

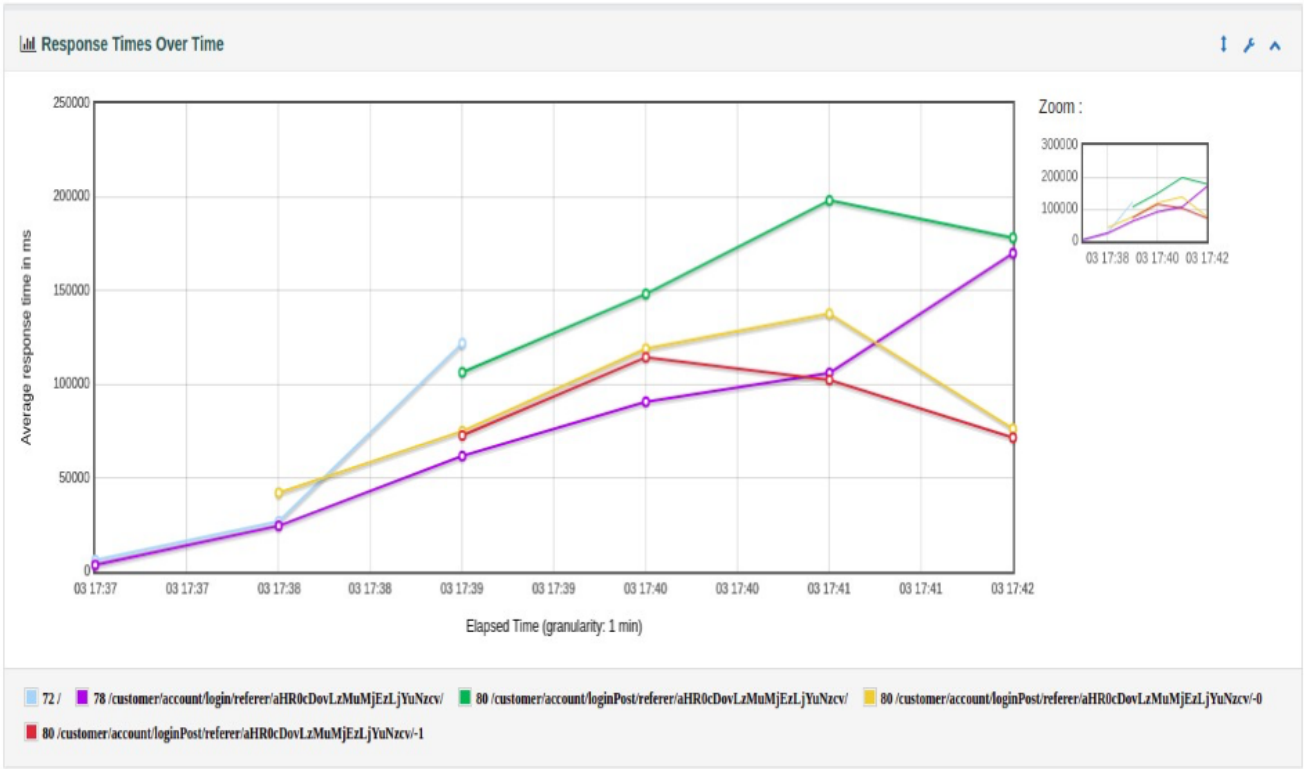


Fig 2: Response Over Time Graph of Sign-in Users

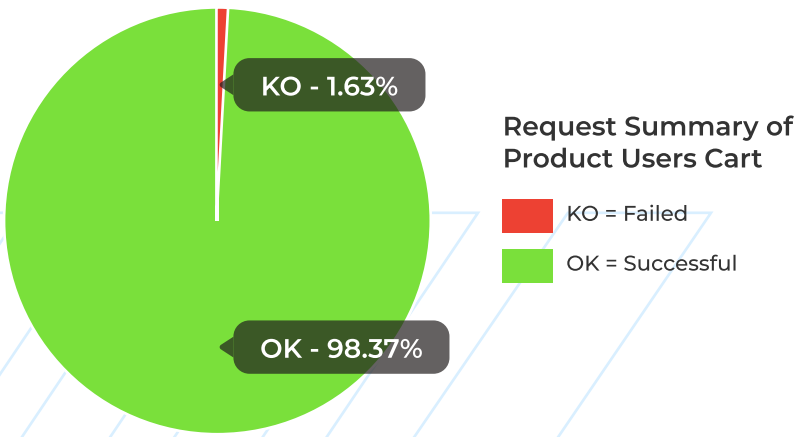
Y-axis - It represents the response time in second or millisecond metrics.
X-axis - It shows the elapsed time. The elapsed time may be relative time or actual time as per the graph's setting.

3. Add Product To Cart _

> In this scenario, I have recorded one add to the cart test using JMeter. Through this test users first, log in to the store, then add one or more items to the cart. After this, all user credentials have been passed with the help of CSV data config to verify that the store can handle multiple users concurrently.

Case	Users	Ramp-Up	Ramp-Up Steps	Hold on Target	Constant Timer(MS)	Error%	Add to Cart Success (User)
1	100	0	0	0	0	0.00	100
2	200	0	0	0	0	0.00	200
3	300	0	0	0	0	0.00	300
3	400	0	0	0	0	0.00	396

Requests Summary _



Response Time Graph _

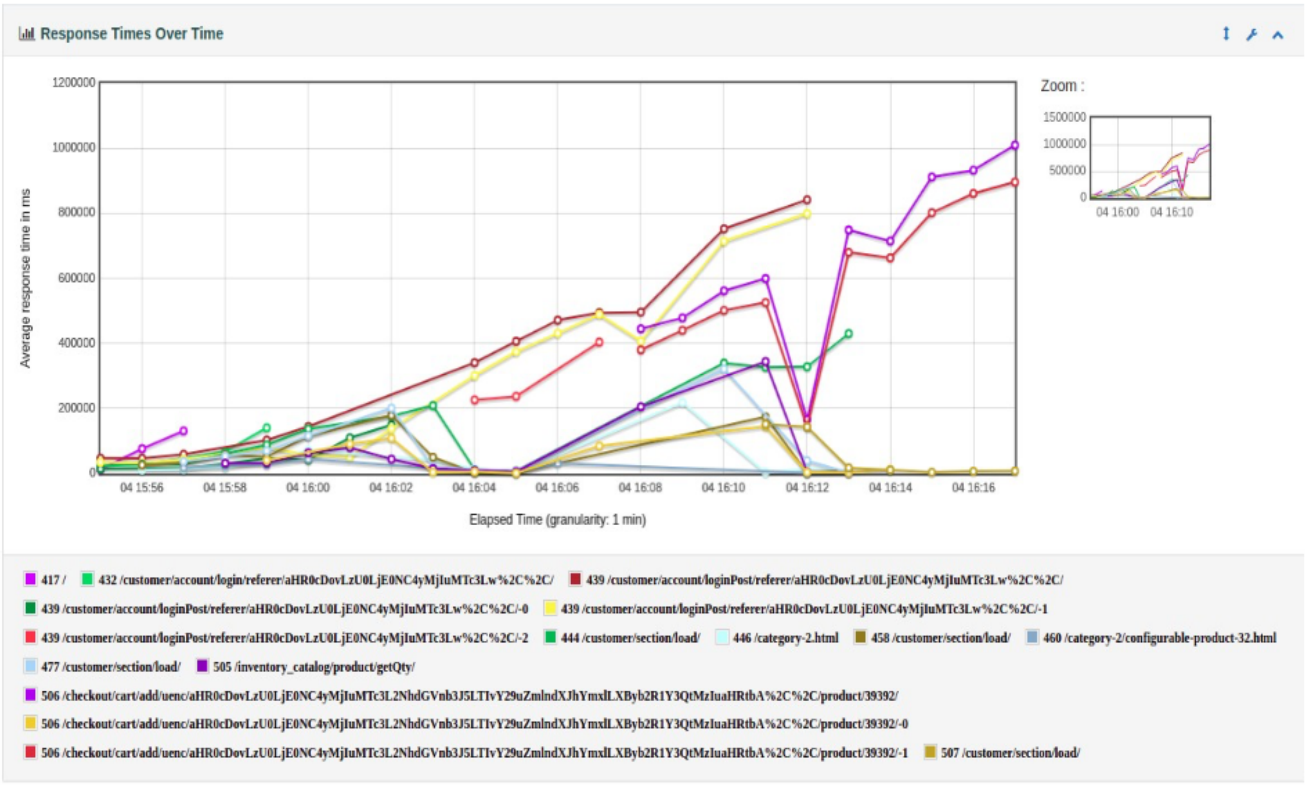


Fig 3: Response Over Time Graph of Product Users Cart

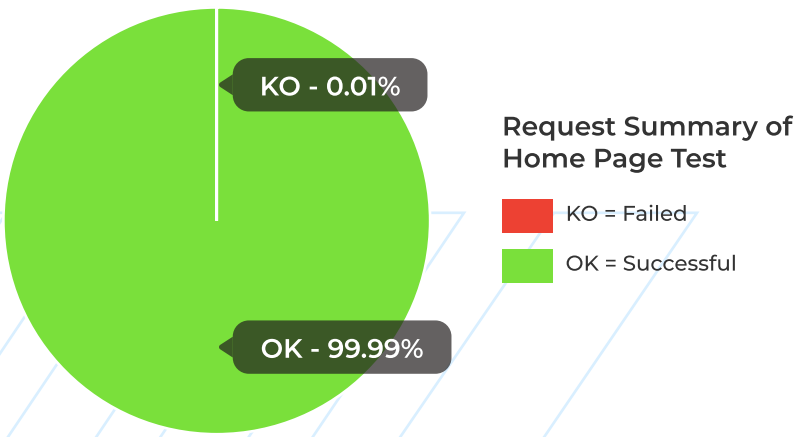
Y-axis - It represents the response time in second or millisecond metrics.
X-axis - It shows the elapsed time. The elapsed time may be relative time or actual time as per the graph's setting.

4. Home Page Browsing

I recorded the Magento 2 Home Page in this scenario and hit the multiple thread groups on the server to ensure that Magento 2 CSS and JS will not get disturbed. The results of the Magento 2 Home Page are as below.

Case	Users	Ramp-Up	Ramp-Up Steps	Hold on Target	Error%
1	100	0	0	0	0.00
2	200	0	0	0	0.00
3	300	0	0	0	0.00
4	400	0	0	0	0.00
5	500	0	0	0	0.01

Requests Summary



Response Time Graph _

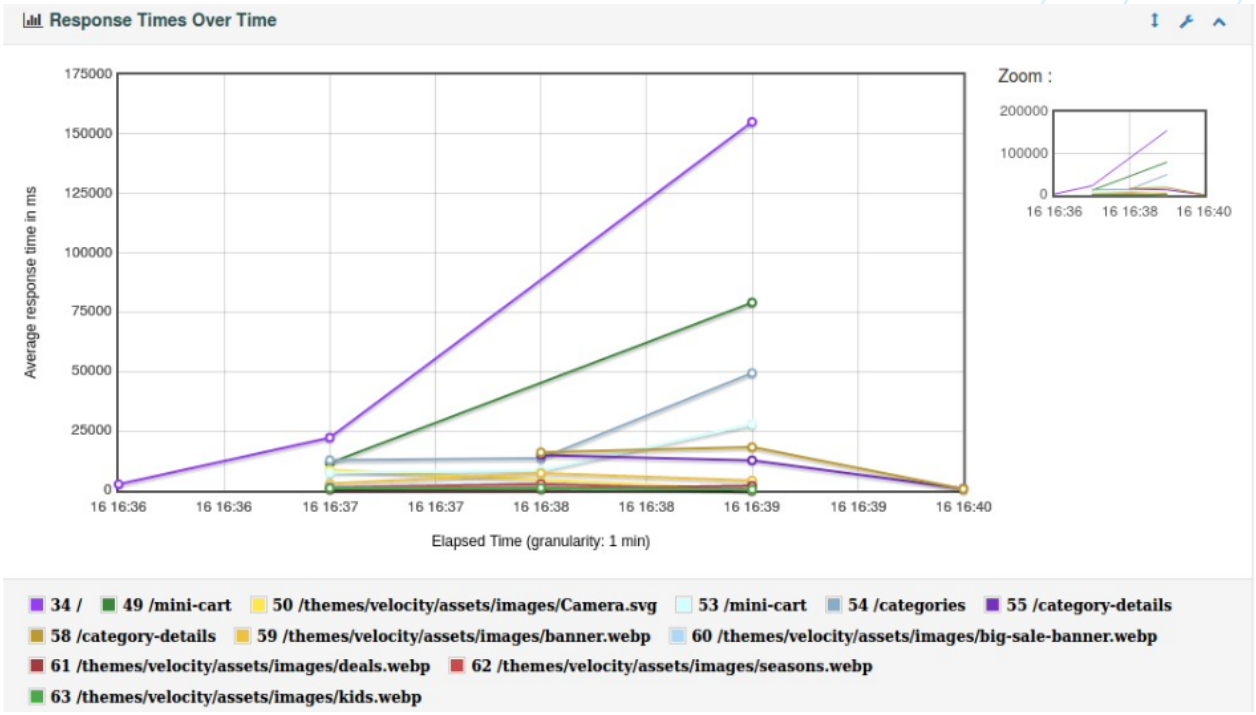


Fig 4: Response Over Time Graph of Home Page Test

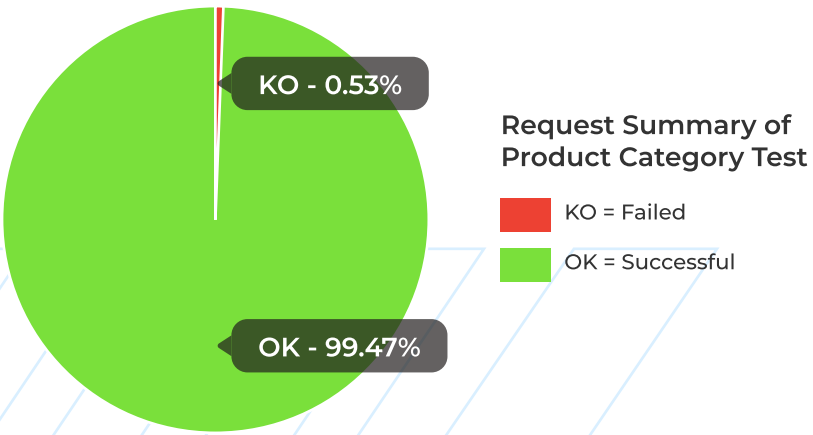
Y-axis - It represents the response time in second or millisecond metrics.
X-axis - It shows the elapsed time. The elapsed time may be relative time or actual time as per the graph's setting.

5. Product and Category Pages

I have tested the store's browsing category product load with this scenario and it is executed smoothly with different users.

Case	Users	Ramp-Up	Ramp-Up Steps	Hold on Target	Error%
1	100	0	0	0	0.00
2	200	0	0	0	0.00
3	300	0	0	0	0.00
4	400	0	0	0	0.00
5	500	0	0	0	0.53

Requests Summary



Response Time Graph _

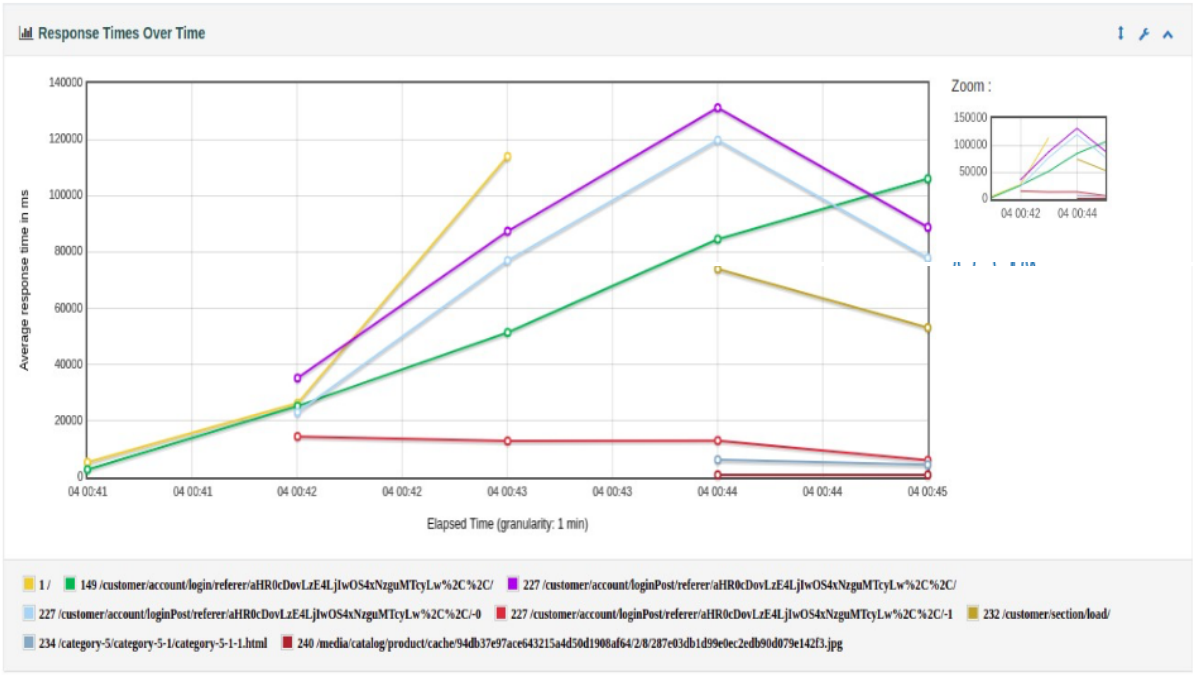


Fig 5: Response Over Time Graph of Product Category Test

Y-axis - It represents the response time in second or millisecond metrics.
X-axis - It shows the elapsed time. The elapsed time may be relative time or actual time as per the graph's setting.

Resource Utilisation Graph _

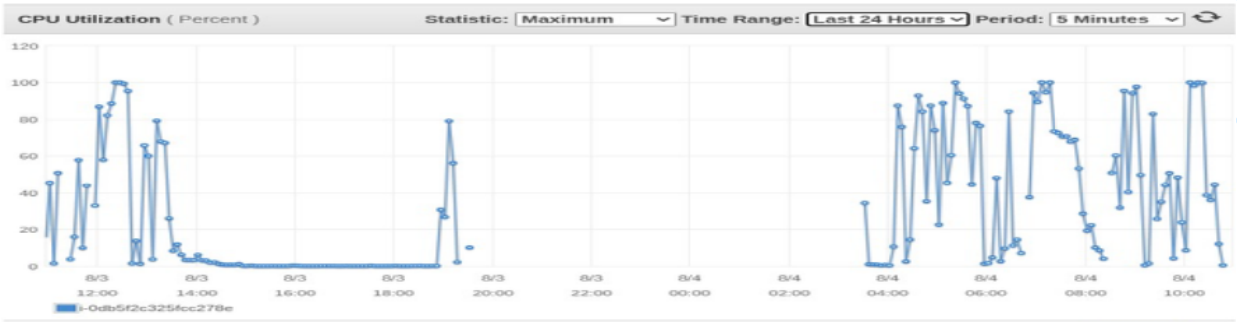


Fig 6: Ec2 CPU Utilization

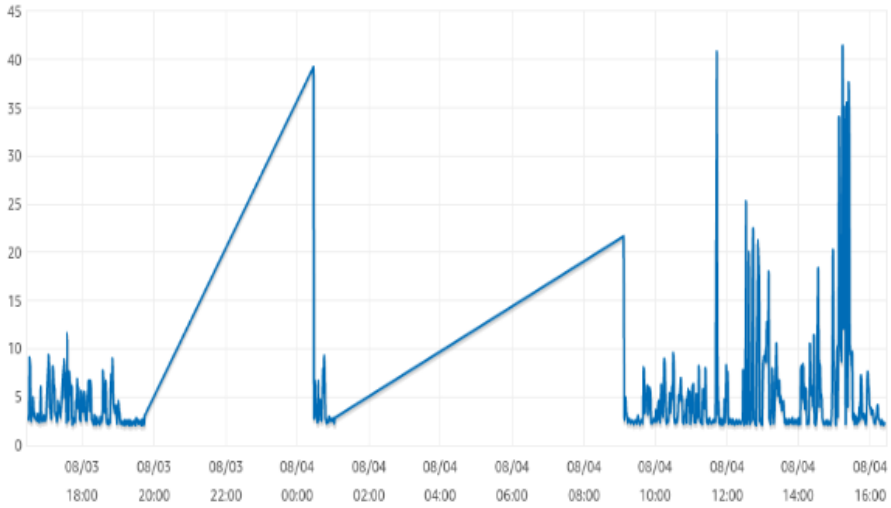


Fig 7: RDS CPU Maximum Utilization

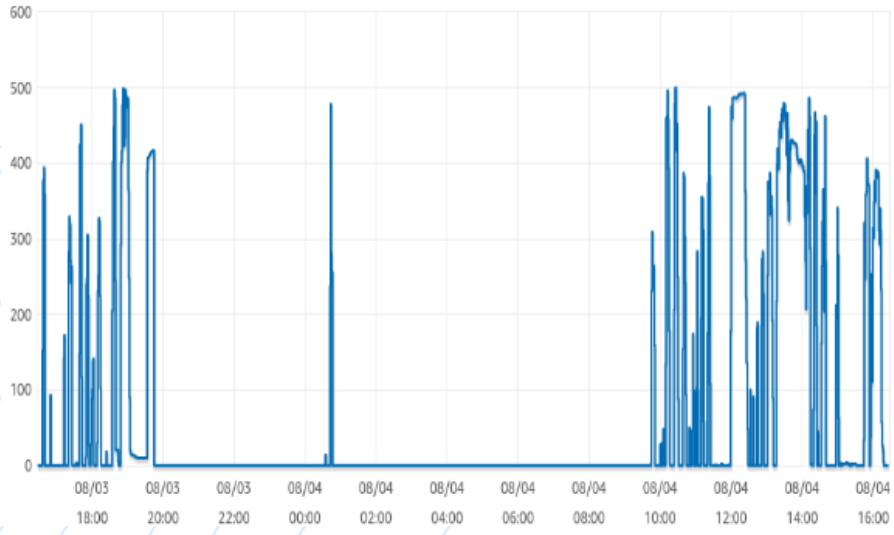


Fig 8: Maximum Database Connections

Conclusion _

According to my analysis, the Magento 2 (v2.4.3-p1) with Ec2 Instance (2vCPU & 8GB RAM) & RDS DB Instance (2 vCPU & 8GB RAM) can serve the aforementioned load times and provide above-average response times through out the test scenarios.

With the stated server configurations and the above-mentioned Apache JMeter Thread Group and Ramp-Up (seconds) period on any operation, a Magento 2 store can handle the load of 400-500 concurrent users (Home Page, Sign-up, Sign-in, Add to Cart, Product Category).

Our Multi-Vendor product provides the finest service with 400-500 concurrent users over this server configuration without any cache server such as varnish. And if you use a cache server, you'll observe that your memory usage is reduced, and Multi-Vendor results are excellent.