

Performance Evaluation & Comparative study of Oracle APEX, PHP and .NET Applications with Testing Tools

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ABSTRACT

Software Development is changing rapidly and it also have different options to choose from for the development of application or website. Many application have been developed and deployed daily and all those applications or websites were tested to check the performance before they are deployed. To evaluate the performance of any application or website many open source and paid application is available so that testing team can test the performance of each application or website.

This paper focus on the Performance evaluation of basic application developed in Oracle APEX, PHP and .NET. APACHE JMeter have been chosen to measure the performance of above application with different virtual load. How applications behaves in different environment have been tested and results recorded. In APACHE JMeter initial test have been conducted with minimum number of virtual user load and slowly increased the user load to test the performance of an application. Different performance measures like Virtual User, Median, Throughput, and Average have been evaluated.

KEYWORDS

Performance Evaluation with JMeter, Oracle APEX Performance Evaluation, PHP Performance Evaluation, .NET Performance Evaluation, Apache JMeter, HP Load Runner

1. INTRODUCTION

Software Development is changing rapidly but the methods are almost same in all the development environment. Nowadays developers required a real Rapid Application Development Tool which can develop and deploy application rapidly. Performance testing is the testing which is performed to ascertain how the components of a system are performing under a particular given situation[1]. Every application or website is tested before it gets deployed to the end-user so that it can performance as if it was implemented to perform.

In this paper three different development platform have been chosen to evaluate the performance of their basic application. Development platform which is tested are Oracle Application Express, PHP and .NET. Basic application have been developed in all the above mentioned development environment and a test have been conducted to evaluated the performance of each development platform. To test the performance of above mentioned application APACHE JMeter have been chosen as this testing tool is one of the widely used tools in the Testing environment which is available as Open Source Tool. Demo version of HP Load Runner have been used to test the performance of application with different virtual user load.

2. BACKGROUND STUDY

Oracle Application Express have been chosen for the performance evaluation test as it is Rapid Application Development Tool. Oracle Application Express (Oracle APEX), is the low code web application development tool for the Oracle database[2]. A Simple Oracle APEX Application have been developed and used for the performance evaluation. Using only a web browser and limited programming experience, you can rapidly develop and deploy professional applications that are both fast and secure for any device from desktop to mobile[2].

PHP development platform have been chosen to perform the test. PHP is a server-side scripting language designed primarily for web development but also used as a general-purpose programming language.[3]

.NET Framework is developed by Microsoft which runs on Windows. It includes a large class library named Framework Class Library (FCL) and provides language interoperability (each language can use code written in other languages) across several programming languages[4].

Apache JMeter have been used to test the performance of application developed in Oracle APEX, PHP and .NET. Apache JMeter is a 100% pure java desktop application designed to load test client/server software (such as a web application).[5] JMeter is Java-based programming software that can perform a load test, performance oriented business (functional) test, regression test, and so on.[6]

3. RESEARCH METHODOLOGY

Following table shows the system on which the test have been run and result recorded. Initial test have been conducted with minimum virtual user load and then it was slowly increased to evaluate the performance of application in different environment.

Table 1. System used for Testing

Processor	Memory	HardDrive	Platform
Intel(R) Core(TM)i7-3500M CPU @2.90Ghz	8.00 GB	1 TB	Windows 8.1 64-bit

Different parameters have been evaluated which is recorded in APACHE JMeter while conducting a test on Oracle APEX, PHP and .NET. This test was conducted to check the performance of different development architecture with different virtual user load.

4. DEVELOPMENT PLATFORM ARCHITECTURES

1. Oracle Application Express Architecture:

APEX was created by Mike Hichwa, a developer at Oracle, after development of his previous project, Web DB, started to diverge from his original vision [7]. Oracle APEX architecture is so simple that even a developer with basic knowledge can develop and application in APEX. Oracle Application Express consists of a metadata repository that stores the definitions of applications and an engine (called the Application Express engine) that renders and processes pages. [8]

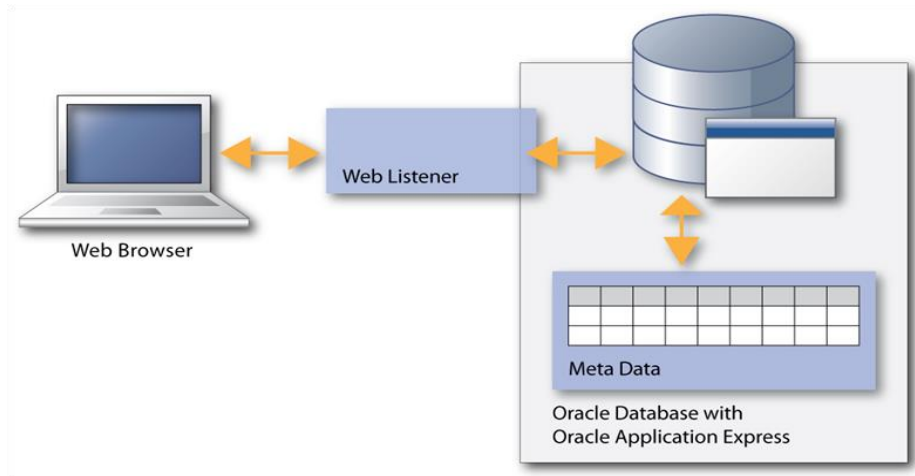


Fig 1: Oracle Application Express Listener[7]

2. PHP Platform Architecture

PHP code may be embedded into HTML or HTML5 markup, or it can be used in combination with various web template systems, web content management systems and web frameworks. [3]

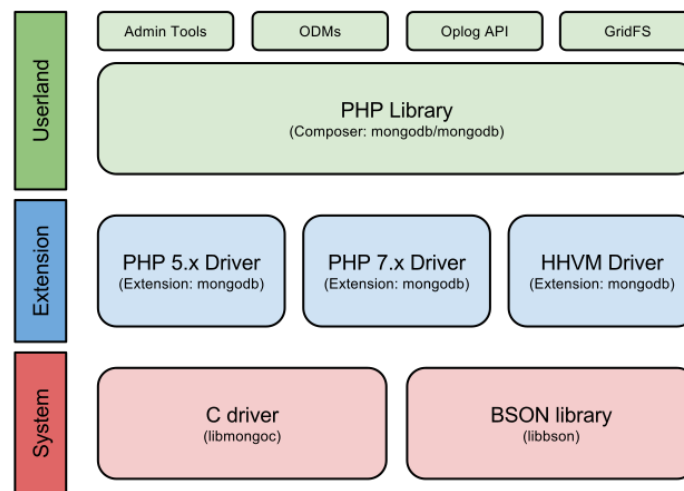


Fig 2: PHP Architecture[9]

3. .NET Architecture

Microsoft’s .NET technology brings together a number of elements, including the .NET framework, the user interface (UI), .NET languages and VisualStudio.NET[10].

5. TESTING RESULTS AND DISCUSSION

Test was conducted in the environment as shown in Table 1 to evaluate the performance of different development environment like Oracle APEX, PHP and .NET. Different performance parameters which is available with Apache JMeter have been used.

Initially 50 Virtual user load have been used to test the performance of Oracle APEX, PHP and .NET application. Test was conducted on all three technologies with 50

virtual user load and then with 400 virtual user load. Performance of all three application developed in different technology is evaluated with different available parameter.

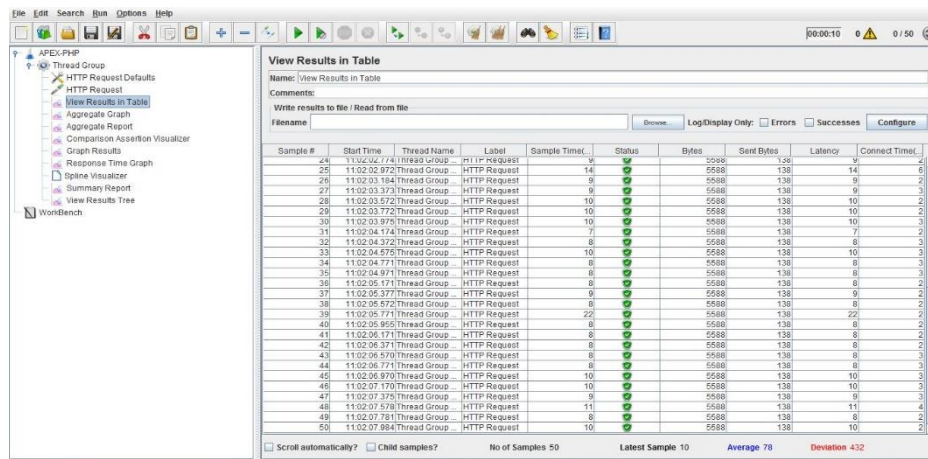


Fig 3: Oracle APEX Application with 50 Virtual User Load in Apache JMeter

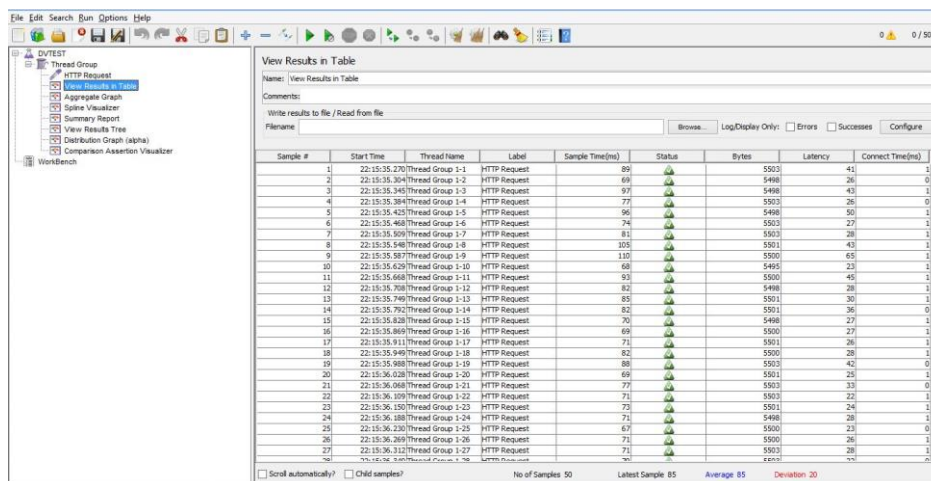


Fig 4: PHP Application with 50 Virtual User Load in Apache JMeter

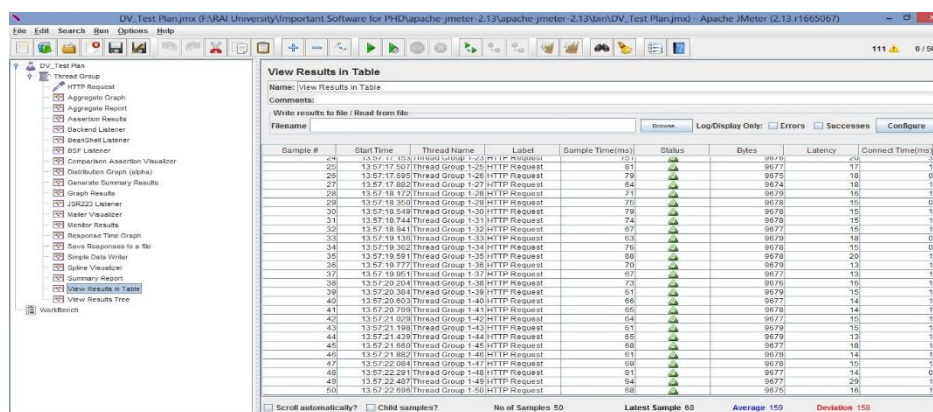


Fig 5: .NET Application with 50 Virtual User Load in Apache JMeter

Following chart shows the performance data analysis of three different application developed in different architecture.

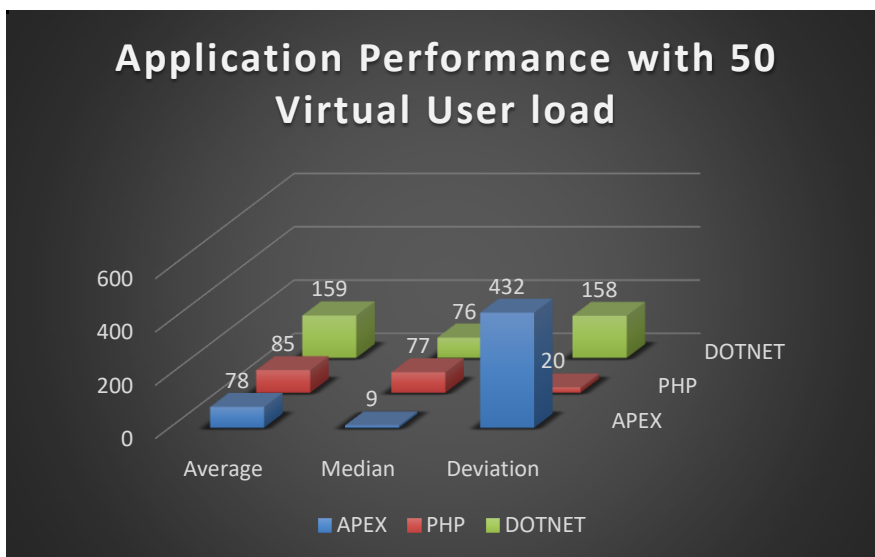


Fig 6: Performance Evaluation Chart with 50 Virtual User Load

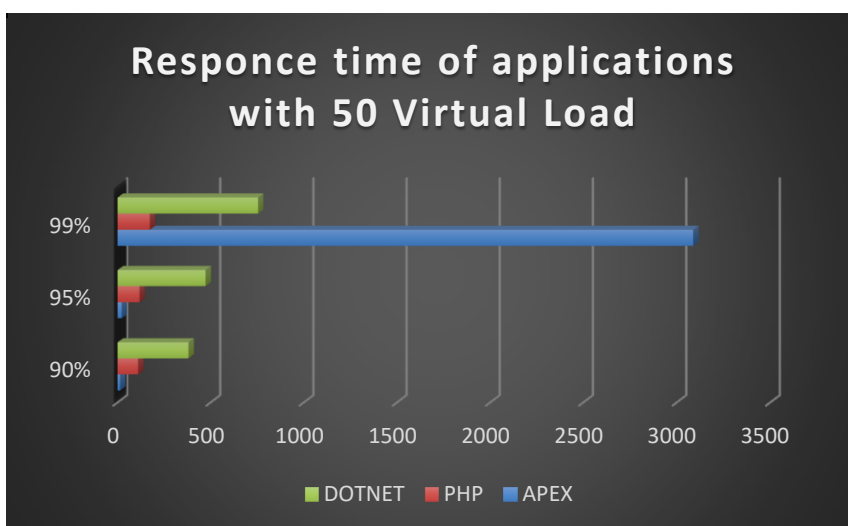


Fig 7: Response time of applications with 50 Virtual User Load

Further the test was extended with increasing the virtual user load to measure the performance of application in different environment. Test was conducted with 400 virtual user load.

Sample #	Start Time	Thread Name	Label	Sample Success	Status	Errors	Latency	Connect Time(ms)
374	00:15:55.000	Thread Group 1	HTTP Request	10	Success	0	2847	11
375	00:15:55.281	Thread Group 1	HTTP Request	12	Success	0	2847	11
376	00:15:55.478	Thread Group 1	HTTP Request	2	Success	0	2847	2
377	00:15:55.478	Thread Group 1	HTTP Request	2	Success	0	2847	2
378	00:15:55.478	Thread Group 1	HTTP Request	2	Success	0	2847	2
379	00:15:55.277	Thread Group 1	HTTP Request	2	Success	0	2847	2
380	00:15:55.260	Thread Group 1	HTTP Request	2	Success	0	2847	2
381	00:15:55.200	Thread Group 1	HTTP Request	2	Success	0	2847	2
382	00:15:55.260	Thread Group 1	HTTP Request	2	Success	0	2847	2
383	00:15:55.200	Thread Group 1	HTTP Request	2	Success	0	2847	2
384	00:15:55.260	Thread Group 1	HTTP Request	2	Success	0	2847	2
385	00:15:55.200	Thread Group 1	HTTP Request	2	Success	0	2847	2
386	00:15:55.260	Thread Group 1	HTTP Request	2	Success	0	2847	2
387	00:15:55.200	Thread Group 1	HTTP Request	2	Success	0	2847	2
388	00:15:55.260	Thread Group 1	HTTP Request	2	Success	0	2847	2
389	00:15:55.200	Thread Group 1	HTTP Request	2	Success	0	2847	2
390	00:15:55.260	Thread Group 1	HTTP Request	2	Success	0	2847	2
391	00:15:55.200	Thread Group 1	HTTP Request	2	Success	0	2847	2
392	00:15:55.260	Thread Group 1	HTTP Request	2	Success	0	2847	2
393	00:15:55.200	Thread Group 1	HTTP Request	2	Success	0	2847	2
394	00:15:55.260	Thread Group 1	HTTP Request	2	Success	0	2847	2
395	00:15:55.200	Thread Group 1	HTTP Request	2	Success	0	2847	2
396	00:15:55.260	Thread Group 1	HTTP Request	2	Success	0	2847	2
397	00:15:55.200	Thread Group 1	HTTP Request	2	Success	0	2847	2
398	00:15:55.260	Thread Group 1	HTTP Request	2	Success	0	2847	2
399	00:15:55.200	Thread Group 1	HTTP Request	2	Success	0	2847	2
400	00:15:55.260	Thread Group 1	HTTP Request	2	Success	0	2847	2

Fig 8: Oracle APEX Application with 400 Virtual User Load in Apache JMeter

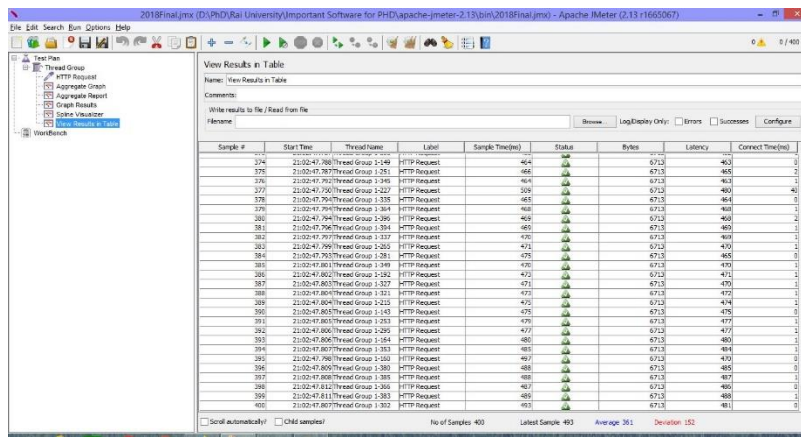


Fig 9: PHP Application with 400 VirtualUser Load in Apache JMeter

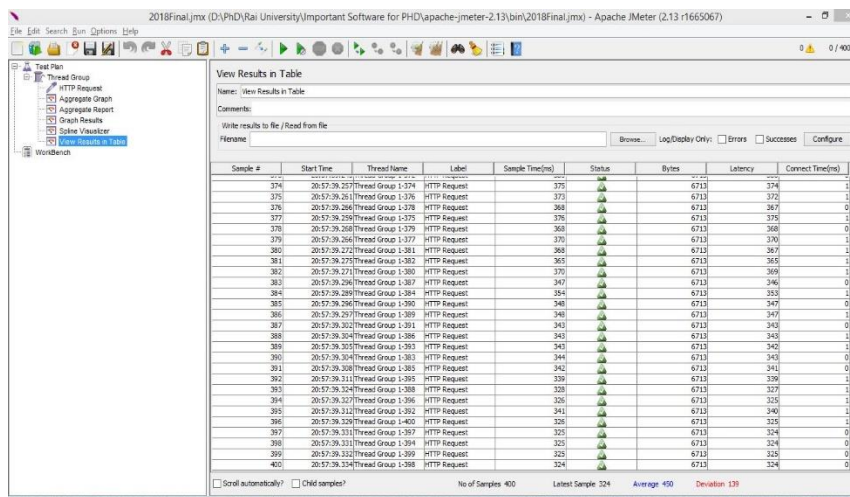


Fig 10: .NET Application with 400 Virtual User Load in Apache JMeter

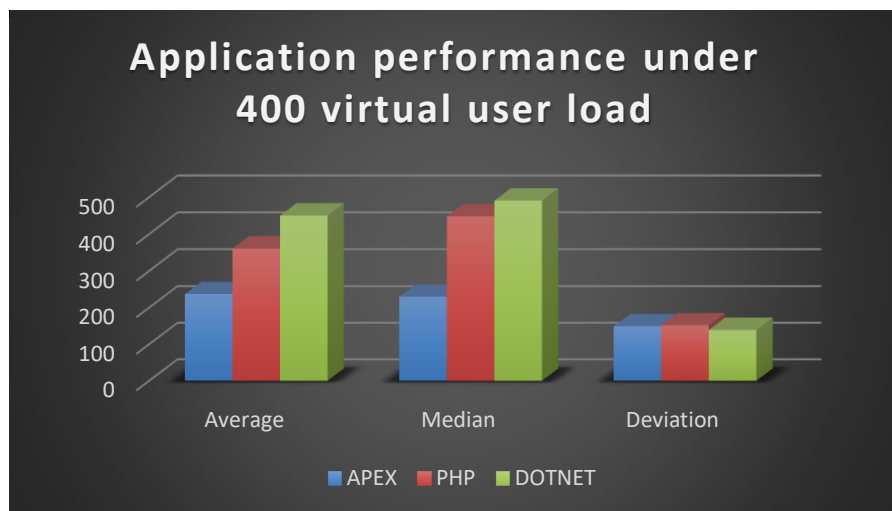


Fig 11: Performance Evaluation Chart with 400 Virtual User Load

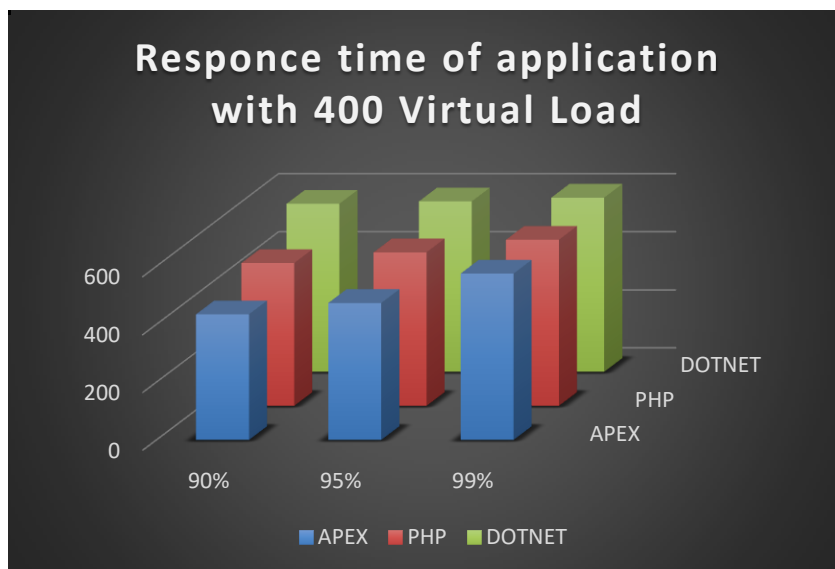
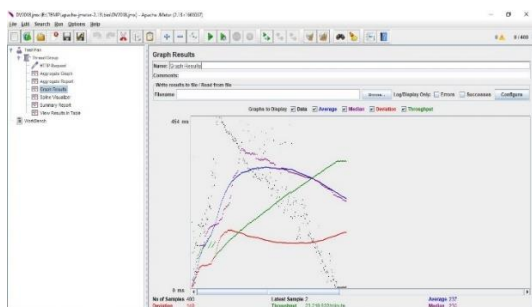
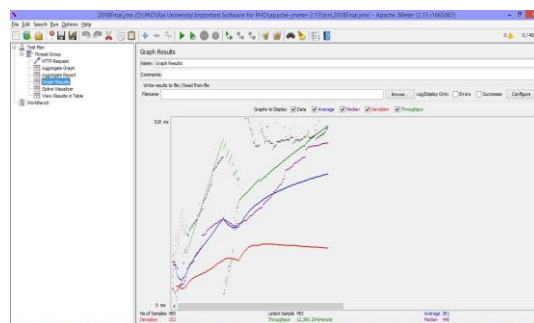


Fig 12: Response time of Application with 400 Virtual User Load

Throughput Graph of APEX Application with 400 Virtual User Load



Throughput Graph of PHP Application with 400 Virtual User Load



Throughput Graph of .NET Application with 400 Virtual User Load

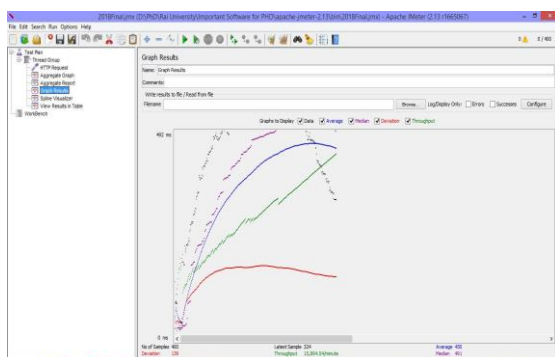


Fig: 13 Throughput Graph of three application with 400 Virtual User Load

As seen with above results that Oracle APEX application provide better results in response time with quick reply from the server on the selected platform in this research study. Different application development environment have been testing with different virtual user load and it have been seen that Oracle APEX performance is superior to other technologies in the above selected environment for the research.

6. CONCLUSION

The purpose of this paper is to show the performance testing on three different application developed under different architecture and conduct a performance evaluation with different virtual user load. As we can see the performance of Oracle Application having better response time, throughput/sec and average time occupied to aid a request with different users start with 50 and then with 400 virtual user load.

Initially test was conducted with 50 users which is increased to 400 to measure the performance of application with different users and it's have been seen that Oracle APEX application provide better performance compared to other selected technologies with this research study.

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